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MONITORING STUDY

Fourth Annual Report

for the period

September 1, 1982 - September 1, 1983

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December 1983

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INTRODUCTION

Northern Lights, Inc. (NLI), a rural electric cooperative based in Sandpoint, Idaho, submitted an application to the Montana Department of Natural Resources and Conservation (DNRC) in 1980 to build a hydroelectric dam and generating plant, known as the Kootenai River Hydroelectric Project, in the Kootenai Falls area of Lincoln County, Montana. In 1978, NLI contracted with DNRC to conduct a baseline wildlife investigation in the project area. The results of that study, completed in September 1979, were published later that year (DNRC 1979).

To keep the wildlife data base current and to determine the nature of year-to-year variations in wildlife use of the project area, NLI contracted with DNRC in October 1979 to monitor wildlife in the study area (see DNRC 1979 for a study plan). This study was designed to provide a data base for documenting project-related impacts and for determining the success of mitigation and compensation programs, should the Board of Natural Resources and Conservation issue a certificate for the project at the Kootenai Falls site.

The first annual report (DNRC 1981a) documented results from the first year of the Kootenai Falls wildlife monitoring study (September 2, 1979, through September 1, 1980). The area monitored in that study was the same as the area inventoried during the original baseline study (DNRC 1979, pp. 2-3), although some surveys also were conducted along U.S. Highway 2 between Libby and Troy.

The second annual report (DNRC 1981b) highlighted results from the second year of the Kootenai Falls wildlife monitoring study (September 1, 1980, through August 31, 1981). The area investigated during that monitoring period was basically the same as studied during the first monitoring period. Some modifications in monitoring study design, as suggested in the first annual report (DNRC 1981a), were employed in the second year of monitoring.

The third annual report (DNRC 1982) presented the results from the third year of the wildlife monitoring study (September 1, 1981, through August 31, 1982). The study area was the same as in the past two years of monitoring with some modifications in study design, as suggested in the second annual report.

This study presents the results of the fourth year of the wildlife monitoring study (September 1, 1982, through September 1, 1983).

METHODS

Field techniques and analytical methods used in this study were as described in the baseline studies report (DNRC 1979, pp. 109–112) and the first annual report (DNRC 1981a). A brief summary of methods employed for individual study segments follows (see also table 1).

Table 1. Schedule of September 1982 - September 1983 field work, Kootenai Falls wildlife monitoring study.

Dates	Observer[1]	Type of Field Work
December 30, 1983-January 3, 1983	PN	Project census, bald eagle survey, bighorn sheep counts.
April 11-14, 1983	PN, LT	Riparian wildlife census, bighorn sheep count, amphibian and reptile search
May 27-30, 1983	SK	Project area census, harlequin duck survey, bighorn sheep count, amphibian and reptile search.
July 29-August 1, 1983	SK	Project area census, harlequin duck survey, bighorn sheep counts, amphibian and reptile search.

[1] PN = Pat Nichols
SK = Stacy Kiser
LT - Larry Thompson

Species List Update

The species lists presented in the baseline report (DNRC 1979) were updated.

Project Area Wildlife Census

This census was designed to collect data that would allow comparison of wildlife use of the project area between months and between years. The methods used were patterned after the standard winter bird study (Kolb 1965) and breeding bird census techniques (Hall 1964, Van Velzen 1972) used in the original inventory, but were expanded to include all vertebrate species. The area censused included: the entire Kootenai River and its shorelines from 50 m (164 ft) below the proposed dam outlet to the upper end of the proposed reservoir; the land that would be inundated by the dam at e forebay elevation of 610 m (2,000 ft); the land that would be affected by railroad relocation; and all remaining land between U.S. Highway 2 and the Kootenai River (see appendix B). The entire area was censused for three consecutive days during each of four study periods, following the instructions outlined in the baseline report (DNRC 1979, appendix F).

Bald Eagle Survey

The Kootenai River between Libby and Troy was surveyed for bald eagles on December 30, 1982, and January 1, 1983 (1 count each day), following the methods of Meyer (1979). Observations were made from U.S. Highway 2. Bald eagles seen during project area wildlife censuses and other monitoring field work also were recorded.

Harlequin Duck Special Studies

In addition to surveys made during project area wildlife censuses, special searches of the Kootenai Falls area for harlequin ducks were conducted in May and July-August. In May, emphasis was placed on determining the total harlequin duck population and the number of pairs present in the project area; in July-August, emphasis was placed on locating broods.

Bighorn Sheep Studies

During the study period, several different methods were used to gather information on bighorn sheep. These methods are described below.

Bighorn sheep were observed from strategic viewpoints along U.S. Highway 2 during each of the four survey field trips (table 1). The cliffs north of the Kootenai River within the project area and within 1 mile (upstream) of the project area were surveyed with a spotting scope. The researchers followed a controlled observation schedule. During each survey, the north bank of the river was searched for 10 minutes from each of 10 observation points along U.S. Highway 2. Two such surveys were conducted in January, six in April, three in May, and three in July. Observations of bighorn sheep made during these surveys, as well as those made in conjunction with other field work, were recorded on maps and standard data sheets. Observations of deer also were recorded. In April, the Sheppard Meadows (DNRC 1981a) were searched for tracks or other evidence of bighorn sheep use.

Amphibian and Reptile Search

During April, May, and July-August, at least four hours each month were spent searching likely habitat in the project area for amphibians and reptiles.

WEATHER

Table 2 summarizes weather data collected at the NOAA Libby recording station (Libby 1 NE Ranger Station) for the period August 1982 through August 1983. The data show that the winter of 1982-83 was much warmer and drier than normal. Average monthly temperatures ranged from 0.7 to 7.6 Fahrenheit degrees (averaging 4.2 degrees) above normal from December through March. Monthly precipitation was near normal throughout this period. Snowfall, which totalled 39 inches, occurred during the period November through April. Although data on average snowfall at this recording station are not available, snowfall during the same period the previous winter, November 1981 through April 1982, totalled 46.9 inches. Snow depths in 1981-82 were relatively low; the greatest depth (15 inches) was recorded in December 1982. During the winter of 1981-82, the maximum snow depth (26.7 inches) occurred in January.

Table 2. Summary of weather parameters at Libby, August 1982–July 1983

Month	Temperature[1] (degrees F.)	Precipitation[2] (inches)	Snowfall (inches)	Maximum Snow Depth on Ground (inches)
August 1982	65.8(+0.5)	0.9(-0.2)	0	0
September 1982	56.3(-0.5)	1.2(-0.1)	0	0
October 1982	44.4(-1.1)	1.3(-0.6)	0	0
November 1982	31.6(-1.6)	2.5(+0.1)	8.3	2
December 1982	26.4(+0.7)	2.8(+0.4)	24.9	15
January 1983	30.3(+7.6)	2.4(-0.2)	4.3	12
February 1983	34.8(+3.8)	1.1(-0.4)	*	6
March 1983	40.7(+4.5)	2.0(+0.8)	0	0
April 1983	45.6(+0.6)	1.1(-0.1)	1.5	0
May 1983	54.6(+0.9)	0.5(-1.0)	0	0
June 1983	60.6(-0.1)	1.7(+0.2)	0	0
July 1983	63.7(-3.0)	2.0(+1.2)	0	0
August 1983	69.2(+3.8)	0.6(-0.5)	0	0

[1] Monthly average (departure from normal)
[2] Total (departure from normal)
* Data unavailable

RESULTS AND DISCUSSION

Species List Update

During this monitoring period, 77 species of vertebrates were observed--1 amphibian, 1 reptile, 68 birds, and 7 mammals. These included five new species--Wood Duck, Caspian Tern, Eastern Kingbird, Evening Grosbeak, and Clark's Nutcracker. These new species bring the total number of species observed since the studies began in 1978 to 123 (1 amphibian, 1 reptile, 93 birds, and 28 mammals). Data on these species are summarized in tables 3 and 4. (NOTE: Nomenclature and phylogenetic sequence have been updated to conform to AOU (1983).

Table 3. Summary of data collected on amphibian, reptile, and bird species observed on the Kootenai Falls study area, January 1978 through August 1982

Species	Habitat[1]	Where Observed[2]	Status and Abundance[3] This Study	Status and Abundance[3] Skeer[4] (1980)	J AN	F EB	M AR	A PR	M AY	J UN	J UL	A UG	S EP	O CT	N OV	D EC
AMPHIBIANS																
Coeur D'Alene Salamander *Plethodon vandykei*	RO	22	NA	NA	–	–	–	A	–	–	–	A	–	–	–	–
REPTILES																
Garter Snake *Thamnophis* spp.	GB	P,2D	NA	NA	–	–	–	–	M	J	J	–	–	–	–	–
BIRDS																
Great Blue Heron *Ardea herodias*	GB,SW,ER	C,D,F,J,H,L,M,N, O,P,Q	e-U	Bw	J	–	–	A	M	J	J	A	–	O	–	D
Canada Goose *Branta canadensis*	SW,GB,RG	C,D,E,M,N	B-C w-C	Bw	J	F	M	A	M	J	–	A	–	–	–	D
Wood Duck *Aix sponsa*	SW	P,S	em-U	b	–	–	–	A	–	–	–	–	–	–	–	–
Green-winged Teal *Anas crecca*	GB,SW	O	em-U	Bw	–	–	–	A	–	–	–	–	–	–	–	–
Mallard *Anas platyrhynchos*	SW,FW,GB,FA,ER,AV, CM	D,F,H,L,M,N, O,P,Q,R,S,T	W-A,B-A	BW	J	F	M	A	M	J	J	A	S	–	N	D
Blue-winged Teal *Anas discors*	GB,SW	M,O	e-R	B	–	–	–	–	–	J	–	–	–	–	–	–
Gadwall *Anas strepera*	GB,SW	O	fm-U	b	–	–	–	–	–	–	–	–	–	O	–	–
American Wigeon *Anas americana*	SW,GB	M	em-R	B	–	–	–	A	M	–	–	–	–	–	–	–
Harlequin Duck *Histrionicus histrionicus*	FA,FW,ER,BR,SW	F,G,H,J,L,M,N	B-U	b	–	–	–	A	M	J	J	A	–	O	–	–
Common Goldeneye *Bucephala clangula*	SW,ER,FW,GB,FA	E,F,H,M,N,O, P,Q,R,S,T	W-A,b-A	BW	J	F	M	A	M	J	–	–	–	–	–	D
Barrow's Goldeneye *Bucephala islandica*	SW,ER	M	b-U	BW	–	–	–	A	M	–	–	–	–	–	–	–
Bufflehead *Bucephala albeola*	SW,AV	M	e-R	Bw	–	–	–	–	–	–	–	A	–	–	–	–

Table 3. (continued)

Species	Habitat[1]	Where Observed[2]	Status and Abundance[3] This Study	Skaar[4] (1980)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Hooded Merganser *Lophodytes cucullatus*	SW	N,O,P	w-R	Bw	J	–	–	–	–	–	–	–	–	–	–	–
Common Merganser *Mergus merganser*	FW,GB,SW,AV,ER	D,F,G,H,M,N,O,P Q,R,S	W-U,B-A	Bw	J	F	M	A	M	J	J	A	S	O	N	D
Osprey *Pandion haliaetus*	OA,SW,FW,SD,CC	D,E,M,N,O,P,Q, 7,19,20,21,22,24	b-C	B	–	–	M	A	M	J	J	A	S	–	–	–
Bald Eagle *Haliaeetus leucocephalus*	SD,RC,DS,SC,CC, PD,OA	B,D,E,F,H,M,V, 8,9,13,21	W-U,s-U	bW	J	F	M	A	–	J	J	–	–	O	N	D
Red-tailed Hawk *Buteo jamaicensis*	PD,OA	2,4,8	w-R,S-U	B	–	F	–	A	–	J	–	A	–	O	–	–
Golden Eagle *Aquila chrysaetos*	PD	6,20	s-R	BW	–	–	–	A	–	–	–	–	–	–	–	–
American Kestrel *Falco sparverius*	SC,RD,CC,DS,SD	21,22	B-U	Bw	–	–	–	–	M	J	J	–	–	–	–	–
Merlin *Falco columbarius*	RD,DS	22	w-U,b-U	bw	J	–	–	–	–	J	–	–	–	–	–	–
Ruffed Grouse *Bonasa umbellus*	DW,DS	8,18,21,22,23	B-U,W-U	BW	–	F	–	A	M	J	–	–	–	O	–	–
Killdeer *Charadrius vociferus*	GB	D,P,25	B-U	BW	J	–	–	A	M	J	–	–	–	–	–	–
Spotted Sandpiper *Actitus macularia*	GB,ER,FA	F,J,K,L,M,N,O	b-C	B	–	–	–	–	M	J	J	A	–	–	–	–
Ring-billed Gull *Larus delawarensis*	SW,OA,ER	I,L	t-U,fm-R	tw	–	–	–	–	–	–	J	–	–	O	–	–
California Gull *Larus californicus*	SW,OA,GB,RD	M	s-U	–	–	–	–	A	–	J	J	A	–	–	–	–
Caspian Tern *Hydroprogne caspia*	ER	M	t-R	t	–	–	–	–	–	–	J	–	–	–	–	–

Table 3. (continued)

Species	Habitat[1]	Where Observed[2]	Status and Abundance[3] This Study	Skaer[4] (1980)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Mourning Dove *Zenaida macroura*	RR,DS,PR	21,20	w-R,b-U	bw	–	F	–	–	M	J	–	A	–	–	–	
Common Nighthawk *Chordeiles minor*	FA	L	s-U	B	–	–	–	–	–	–	J	A	–	–	–	–
Black Swift *Cypseloides niger*	OA	L	s-R	b	–	–	–	–	–	–	J	A	–	–	–	–
Vaux's Swift *Chaetura vauxi*	OA	L,M	sm-U	b	–	–	–	–	M	–	–	–	–	–	–	–
White-throated Swift *Aeronautes saxatilis*	DA	M	s-R	b	–	–	–	–	–	–	–	A	–	–	–	–
Calliope Hummingbird *Stellula calliope*	PR,RR,RD,DS	22	s-R	B	–	–	–	–	–	–	J	–	–	–	–	–
Rufos Hummingbird *Selasphorus rufus*	DS	21	s-U	B	–	–	–	–	M	J	J	–	–	–	–	–
Belted Kingfisher *Megaceryle alcyon*	SW	D,N	w-R,s-U	BW	–	F	–	–	M	–	J	A	–	–	–	–
Downy Woodpecker *Picoides pubescens*	RR	21	t-R,w-R	bW	J	–	–	–	–	–	–	–	–	O	–	–
Hairy Woodpecker *Picoides villosus*	DW,RC,CC,SD	18,21	W-R,s-R	BW	J	–	–	–	M	–	–	–	–	–	–	–
Northern Flicker *Colaptes auratus*	RC,CC,SD,DW,DN	21	S-U	BW	–	–	–	A	M	J	J	A	–	D	–	–
Pileated Woodpecker *Dryocopus pileatus*	DW	18,22	W-R,s-R	bW	J	–	–	A	–	J	–	–	–	–	–	–
Willow Flycatcher *Empidonax traillii*	WI,RA	10,21	b-U	b	–	–	–	–	M	J	–	–	–	–	–	–

Table 3. (continued)

Species	Habitat[1]	Where Observed[2]	Status and Abundance[3] This Study	Skaer[4] (1980)	J AN	F EB	M AR	A PR	M AY	J UN	J UL	A UG	S EP	O CT	N OV	D EC
Flycatcher (sp. undeterm.) *Empidonax* sp.	DW,AD,DS,DN	17,19,21,22	b-U		-	-	-	-	M	J	-	-	-	-	-	-
Eastern Kingbird *Tyrannus tyrannus*	RC	21	t-R	B	-	-	-	-	-	-	J	-	-	-	-	-
Tree Swallow *Iridoprocne bicolor*	OA,SO	L,M,21	B-U	B	-	-	-	-	M	J	J	-	-	-	-	-
Violet-green Swallow *Tachycineta thalassina*	OA,PR,BR	F,G,H,I,J,K,L,M, 21	b-A	B	-	-	-	A	M	J	J	A	-	-	-	-
Northern Rough-winged Swallow *Stelgidopteryx serripennis*	OA,BR	F,G	B-U	B	-	-	-	-	M	J	J	-	-	-	-	-
Barn Swallow *Hirundo rustica*	OA,PR	21	b-U	B	-	-	-	-	-	J	-	A	-	-	-	-
Steller's Jay *Cyanocitta stelleri*	DW	22	fm-R	bW	J	-	-	A	-	-	-	-	-	O	-	-
Clark's Nutcracker *Nucifraga columbiana*	CC	21	b-R	bW	-	-	-	A	-	-	-	-	-	-	-	-
American Crow *Corvus brachyrhynchos*	DW,PD,DS,DN,OA,ER, RC,CC	L,B,17,18,19,20, 21,22,23,24	W-A,b-A	b	J	F	M	A	M	J	J	A	-	O	-	D
Common Raven *Corvus corax*	DW,PD,RO,DS,DN,OA, RC,CC	M,8,10,26,25,22, 21,20	W-C,B-C	BW	J	-	-	A	M	J	J	A	-	O	-	-
Black-capped Chickadee *Parus atricapillus*	DW,DS,CC,BA,SO,DN	19,20,21,22,23,24	W-A,B-A	BW	J	F	M	A	M	J	J	A	-	O	-	D
Mountain Chickadee *Parus gambeli*	OW	22	fm-U	BW	J	-	-	-	-	-	-	-	-	O	-	D
Boreal Chickadee *Parus hudsonicus*	BA	19	t-R	bw	-	-	-	A	-	-	-	-	-	-	-	-
Chestnut-backed Chickadee *Parus rufescens*	DS,BA	21	w-U,B-U	bw	J	-	-	A	-	-	-	-	-	-	-	-
Red-breasted Nuthatch *Sitta canadensis*	DW,OS	22	w-U,s-U	BW	J	-	M	A	-	J	-	-	-	O	-	-
Brown Creeper *Certhia familiaris*	DW	22	w-R	BW	-	F	-	-	-	-	-	-	-	-	-	-

Table 3. (continued)

Species	Habitat[1]	Where Observed[2]	Status and Abundance[3] This Study	Skaer[4] (1980)	J A N	F E B	M A R	A P R	M A Y	J U N	J U L	A U G	S E P	O C T	N O V	D E C
Dipper *Cinclus mexicanus*	RA,FA,ER,GB,FW	F,H,I,J,L,P,Q,21	W-C,b-C	BW	J	F	M	A	M	J	J	A	–	O	N	D
Canyon Wren *Catherpes mexicanus*	ON	9	b-U	–	–	–	–	–	–	J	–	–	–	–	–	–
Winter Wren *Troglodytes troglodytes*	OW	22	s-R,w-R	BW	J	–	–	A	M	J	–	–	–	–	–	–
Golden-crowned Kinglet *Regulus satrapa*	DW	3,4,17,18,20,21, 22,23,24,25	W-A,b-A	BW	J	F	M	A	M	J	J	–	–	O	–	–
Ruby-crowned Kinglet *Regulus calendula*	DW,CC	21	b-U	B	–	–	–	A	M	–	–	–	–	–	–	–
Mountain Bluebird *Sialia currucoides*	RO,BR	22,J	t-U	B	–	–	–	A	–	J	–	–	–	O	–	–
Townsend's Solitaire *Myadestes townsendi*	PD,RD,CC	4,21	w-U,s-U	BW	–	–	M	A	–	J	–	A	–	O	–	–
Veery *Catharus fuscescens*	CC	21	b-U	b	–	–	–	–	–	–	–	A	–	–	–	–
Swainson's Thrush *Catharus ustulatus*	DS,DW,DN	3,4,13,20,21,22	B-C	B	–	–	–	A	M	J	J	–	–	–	–	–
American Robin *Turdus migratorius*	DW,DS,CC,RC,PD,DN, BA,BR,OA	I,N,5,8,13,20, 21,22	b-C	BW	–	–	M	A	M	J	J	A	–	–	–	–
Varied Thrush *Ixoreus naevius*	DW,DN	8,20,21,22	b-C	Bw	–	–	M	A	M	J	–	–	–	–	–	–
Gray Catbird *Dumetella carolinensis*	BA,AD	19,21	b-U	B	–	–	–	–	–	J	–	–	–	–	–	–
Cedar Waxwing *Bombycilla cedrorum*	DS,PD,BA	20,22	s-U	Bw	–	–	–	–	–	J	J	A	–	–	–	–
Northern Shrike *Lanius excubitor*	CC	19	w-R	tW	J	–	–	–	–	–	–	–	–	–	–	–

Table 3. (continued)

Species	Habitat[1]	Where Observed[2]	Status and Abundance[3] This Study	Skear[4] (1980)	J A N	F E B	M A R	A P R	M A Y	J U N	J U L	A U G	S E P	O C T	N O V	D E C
Warbling Vireo *Vireo gilvus*	AO,CC,RR,OW,BA	21,22	b-U	B	-	-	-	-	-	J	J	-	-	-	-	-
Red-eyed Vireo *Vireo olivaceus*	DS,DW,DN,BA	9,20,21	b-U	B	-	-	-	-	-	J	J	-	-	-	-	-
Orange-crowned Warbler *Vermivora celata*	BA,CC,PR,DS	22	b-R	b	-	-	-	-	-	-	J	-	-	-	-	-
Nashville Warbler *Vermivora ruficapilla*	BA,CC,DS	20,21,22	b-C	B	-	-	-	-	M	J	-	-	-	-	-	-
Yellow Warbler *Dendroica petechia*	DS,WI,BA,CC	20,21,22,23	b-C	B	-	-	-	A	M	J	-	A	-	-	-	-
Yellow-rumped Warbler *Dendroica coronata*	DW,DS,CC,DN	3,4,5,20,21,22	b-A	B	-	-	-	A	M	J	J	A	-	-	-	-
Townsend's Warbler *Dendroica townsendi*	DW	21,22	b-U	B	-	-	-	-	-	J	J	-	-	-	-	-
American Redstart *Setophaga ruticilla*	BA,DW,CC	22	b-U	B	-	-	-	-	-	J	J	-	-	-	-	-
MacGillivrey's Warbler *Oporornis tolmiei*	DW,RR,BA,CC	18,20,21,22	b-C	B	-	-	-	A	M	J	J	-	-	-	-	-
Western Tanager *Piranga ludoviciana*	DW,DN,DS,PR,CC	20,21,22	b-U	B	-	-	-	-	-	J	J	-	-	-	-	-
Lazuli Bunting *Passerina amoena*	CC,DW,DS	21	e-R	b	-	-	-	-	-	J	-	-	-	-	-	-
Rufous-sided Towhee *Pipilo erythrophthalmus*	BA	21	b-U	bW	-	-	-	A	-	-	-	-	-	-	-	-
Chipping Sparrow *Spizella passerina*	DS,DW,CC,DN	4,19,20,21,22	B-C	B	-	-	-	-	M	J	J	-	-	-	-	-
Lincoln's Sparrow *Melospiza lincolnii*	OW,DS	21,22	e-R	b	-	-	-	-	M	-	J	-	-	-	-	-
Song Sparrow *Melospiza melodia*	RR,RG,DS,PR,WI,BA	10,18,19,20,21,22	W-U,B-A	BW	J	F	M	A	M	J	J	A	-	D	N	D

Table 3. (continued)

Species	Habitat[1]	Where Observed[2]	Status and Abundance[3] This Study	Skaar[4] (1980)	J A N	F E B	M A R	A P R	M A Y	J U N	J U L	A U G	S E P	O C T	N O V	D E C
Dark-eyed Junco *Junco hyemalis*	OW,ON,PO,DS,CC	3,4,19,20,21, 22,23	B-C	BW	–	–	–	A	M	J	J	A	–	–	–	–
Snow Bunting *Plectrophenax nivalis*	PR	21	w-U	tW	J	–	–	–	–	–	–	–	–	–	–	–
Western Meadowlark *Sturnella neglecta*	RG	21	t-R	BW	–	–	–	–	–	–	–	–	–	O	–	–
Brown-headed Cowbird *Molothrus ater*	PR,ER,DS,CC	L,M,20,21	b-C	B	–	–	–	–	M	J	J	–	–	–	–	–
Pine Grosbeak *Pinicola enucleator*	CC	N	t-R	bW	–	–	–	–	–	–	–	A	–	–	–	–
Red Crossbill *Loxia curvirostra*	DS,DW,CC,DN	19	B-C	bW	–	–	–	A	–	J	–	–	S	O	–	–
Pine Siskin *Carduelis pinus*	PO,DW,DN,CC	20,21	B-C	bW	–	–	–	A	M	J	–	A	–	–	–	–
American Goldfinch *Carduelis tristis*	CC,RG,DS,DA	M	s-R	bW	–	–	–	–	–	J	–	–	–	–	–	–
Evening Grosbeak *Hesperiphone vespertina*	CC	20	t-U	bW	–	–	–	A	–	–	–	–	–	–	–	–

Table 3. (continued)

Footnotes:

1 Habitat category abbreviations as in appendix A.

2 See appendix B for location codes of river stretches (letters) and upland areas (numbers).

3 Status: W – Overwinters in area (at least one record each during January and February).
w – Transient in winter.
sm – Spring migrant.
fm – Fall migrant.
B – Breeds on area (nest or dependent young located).
b – Probably breeds on area (territorial males or pairs located).
s – Summers on area in small numbers but no evidence of breeding.
t – Occurs but no evidence of breeding.

Abundance: A – Abundant; found in large numbers in appropriate habitats.
C – Common; found in moderate numbers in appropriate habitats; 15 to 50 registrations.
U – Uncommon; small numbers in appropriate habitats; 2 to 15 registrations.
R – Rare; few sightings; 1 or 2 registrations.

4 Indicates status of species in Latilong No. 1, as reported by Skaar (1980).

5 Months when seen are indicated by letter abbreviations in sequence, January through December (Note: Very little field work was carried out in September and November.)

Table 4. Summary of data collected on general habitat use and local distribution of mammals observed on the Kootenai Falls study area, January 1978-August 1982.

Common Name	Scientific Name	General Habitat Description[1]	Where Observed[2]
Masked Shrew	(Sorex cinereus)	Trapped in western red cedar forest (DW)	21
Vagrant Shrew	(Sorex vagrens)	Riparian grassland; Douglas fir & western red cedar forest(RG,DW,DN)	21
Mountain Cottontail	(Sylvilagus nuttallii)	Railroad right-of-way (RR)	21
Snowshoe Hare	(Lepus americanus)	Railroad right-of-way (RR)	21
Golden-mantled Ground Squirrel	(Spermophilus lateralis)	Open, Douglas fir/ponderosa pine forest and scree on north side of river (PD,ST)	4
Columbian Ground Squirrel	(Spermophilus columbianus)	Banks in open areas along railroad tracks; north of river in open Douglas fir-ninebark forest (RR,RG,DN)	3,4,20,21,22
Red-tailed Chipmunk	(Eutamias ruficaudus)	Railroad right-of-way; talus (RR,ST,PD)	21,22,19
Yellow-pine Chipmunk	(Eutamias amoenus)	Railroad right-of-way; talus (RR,ST,PD)	21,22,19
Red Squirrel	(Tamiasciurus hudsonicus)	Conifers; several middens in Section 21 (DW,DS,DN)	3,4,5,6,20,21,22, 23,24
Northern Flying Squirrel	(Glaucomys sabrinus)	Remains discovered in conifers (DW); Trapped in riparian forest (CC)	22
Beaver	(Castor canadensis)	Undercut banks along south shore of river falls and observed in calm water below the falls (WI,SW)	M,N,D,E
Northern Pocket Gopher	(Thomomys talpoides)	Riparian grassland (RG)	
Deer Mouse	(Peromyscus maniculatus)	Coniferous forest, talus (DW,DS,ST,DN) riparian grassland (RG)	21
Red-backed Vole	(Clethrionomys gapperi)	Western red cedar forest (DW), riparian grassland (RG)	21

Table 4. (continued)

Common Name	Scientific Name	General Habitat Description[1]	Where Observed[2]
Meadow Vole	(Microtus pennsylvanicus)	Riparian grassland (RG)	21
Long-tailed Vole	(Microtus longicaudus)	Riparian grassland and shrubbery (RG,RC)	21
Muskrat	(Ondatra zibethica)	Below the falls in calm water (SW) Above the falls in calm water, on rocks alongside of Canyon(RO)	E
Meadow Jumping Mouse	(Zapus princeps)	Riparian grassland (RG)	21
Bushy-tailed Woodrat	(Neotoma cinerea)	Steep sidehill, large rocks in timber, railroad right-of-way (RO,RR)	22
Mink	(Mustela vison)	Remains discovered on highway 2	21
River Otter	(Lutra canadensis)	Dense, deciduous bank vegetation and river (SW,AV,ER)	M-N
Coyote	(Canis latrans)	Conifer forests, deciduous vegetation, meadows, shore (DW,RG,GB)	21
Black Bear	(Ursus americanus)	Trail through dense vegetation leading to river; apparently regularly used, Orchard in Shepperd Meadows (OR)	18
White-tailed Deer	(Odocoileus virginianus)	Often associated with water and dense brush but also observed in rocky habitats, railroad right-of-way (PD,DS,RR,DW), gravel bar (GB)	5,6,9,13,0
Mule Deer	(Odocoileus hemionus)	Often observed on steep timbered hillsides but also occurring on the flood plain (PD,DN)	5,10,12,21
Elk	(Cervus canadensis)	Tracks seen in cedar forest (DW) and along railroad ROW (RR)	21
Moose	(Alces alces)	River floodplain and cedar forest (RC,DW)	17,19
Bighorn Sheep	(Ovis canadensis)	Primarily in Douglas-fir habitat types and associated bluffs, broken terrain, cliffs and parks north of the river (RO,DN,DS,RG,PD,ST)	1,2,3,4,5,6,7,8, 9,10,11,12,13

Table 4. (continued)
Footnotes:

1 Habitat category abbreviations as in appendix A.

2 See appendix B for location codes of river (letters) and upland (numbers) portions of the study area.

Project Area Wildlife Census

Results of the wildlife censuses conducted in the project area during the study period are summarized in table 5.

Table 5. Results of project area wildlife censuses, September 1982-August 1983.

Species	Average number known present per trip			
	Dec.-Jan.	Apr.	May	July-Aug.
REPTILES				
Unidentified Garter Snake	-	-	0.3	0.7
BIRDS				
Great Blue Heron	0.3	1.3	1.0	1.3
Canada Goose	2.7	4.0	6.3	-
Wood Duck	-	0.3	0.6	-
Mallard	13.7	45.7	20.7	5.3
Harlequin Duck	-	1.0	2.3	-
Common Goldeneye	31.0	7.7	0.3	-
Common Merganser	5.0	8.0	2.3	9.0
Unidentified Duck	3.3	-	2.0	-
Osprey	-	-	0.7	3.0
Bald Eagle	1.3	-	-	-
Red-tailed Hawk	-	-	-	0.7
American Kestrel	-	-	0.3	1.7
Ruffed Grouse	-	-	-	0.3
Killdeer	-	2.3	1.7	0.3
Spotted Sandpiper	-	-	11.0	3.3
California Gull	-	0.3	-	1.0
Unidentified Gull	-	-	0.3	0.7
Mourning Dove	-	-	1.3	1.0
Black Swift	-	-	-	0.7
Unidentified Hummingbird	-	-	0.3	1.3
Belted Kingfisher	-	0.7	0.7	0.3
Hairy Woodpecker	-	-	-	0.3
Northern Flicker	-	3.7	1.7	2.0
Pileated Woodpecker	-	-	0.3	-
Unidentified Woodpecker	-	-	0.3	0.3
Empidonax Flycatcher	-	-	0.7	0.3
Eastern Kingbird	-	-	-	0.7
Violet-green Swallow	-	22.0	*	5.3
Northern Rough-winged Swallow	-	-	*	3.0
Barn Swallow	-	-	5.3	5.3
Steller's Jay	0.3	18.3	0.3	-
Common Crow	7.0	30.3	13.0	22.0
Common Raven	0.3	1.3	1.7	2.7
Black-capped Chickadee	3.7	6.7	8.3	14.7

Table 5. (continued)

Species	Average number known present per trip: Dec.–Jan.	April	May	July–Aug.
Mountain Chickadee	1.0	–	–	–
Chestnut-backed Chickadee	–	1.0	–	–
Red-breasted Nuthatch	0.3	4.7	1.3	0.7
Winter Wren	0.7	0.3	–	–
Dipper	4.7	3.0	1.7	0.7
Golden-crowned Kinglet	–	26.7	13.0	7.7
Ruby-crowned Kinglet	–	0.3	–	–
Townsend's Solitaire	–	–	0.7	–
Swainson's Thrush	–	–	3.3	1.3
American Robin	–	29.7	16.3	3.7
Varied Thrush	–	18.0	9.7	0.3
Unidentified Thrush	–	–	–	0.3
Cedar Waxwing	–	–	2.3	9.7
Red-eyed Vireo	–	–	3.0	2.3
Nashville Warbler	–	–	1.0	–
Yellow Warbler	–	–	11.7	2.3
Yellow-rumped Warbler	–	–	0.3	0.7
Townsend's Warbler	–	–	–	0.3
American Redstart	–	–	0.3	–
MacGillivray's Warbler	–	–	4.0	0.3
Unidentified Warbler	–	–	1.7	4.3
Western Tanager	–	–	0.3	1.7
Chipping Sparrow	–	–	1.0	1.7
Song Sparrow	0.7	30.0	25.3	15.7
Dark-eyed Junco	–	15.3	2.7	2.7
Brown-headed Cowbird	–	–	3.3	2.0
Pine Grosbeak	–	–	0.3	–
Red Crossbill	–	6.3	–	–
Pine Siskin	–	31.7	12.7	23.3
Evening Grosbeak	–	1.0	–	–
Unidentified Passerine	7.3	–	37.3	21.3
Unidentified Bird	–	0.3	–	–
MAMMALS				
Unidentified Chipmunk	–	6.7	3.0	3.0
Columbian Ground Squirrel	–	–	0.3	0.3
Red Squirrel	0.7	2.0	0.3	14.7
Unidentified Vole	–	–	–	0.3
White-tailed Deer	–	1.7	.3	0.7
Mule Deer	–	–	–	1.3
Bighorn Sheep	0.3	–	–	1.0

Table 5. (continued)

Species	Total number known present during census period			
	Dec.–Jan.	April	May	July–Aug.
Number of Species				
Water Birds	7	11	13	9
Other Birds	8	18	33	33
All Birds	15	29	46	42
Mammals	2	3	4	7
Total Birds & Mammals	17	32	50	49

* Present in large numbers but no count made.

Seasonal variation in numbers of species encountered during project area censuses each month is shown in figures 1 and 2. Study data show that the number of water-related bird species (waterfowl, shorebirds, herons, gulls, ospreys, bald eagles, dippers, belted kingfishers) remains relatively constant year round, with a slight increase during the breeding season. The number of species of other birds, although relatively high throughout the year, increases considerably during the breeding season.

Census results for the dipper are shown in figure 3, and variations in average monthly abundance of the most common waterfowl species, as determined by the censuses, are portrayed in figure 4. Seasonal variations in duck numbers are shown in figure 5. This figure shows that river sections M and N (see appendix B) are the most heavily used by waterfowl, especially in April.

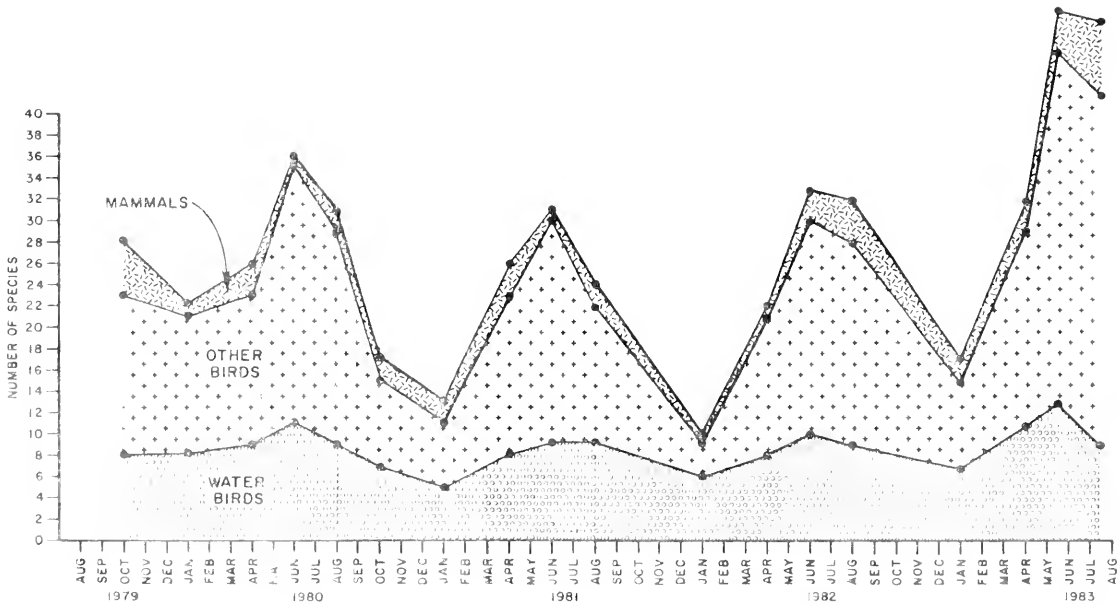


Figure 1. Seasonal variation in total numbers of species encountered during project area censuses, 1979-1983.

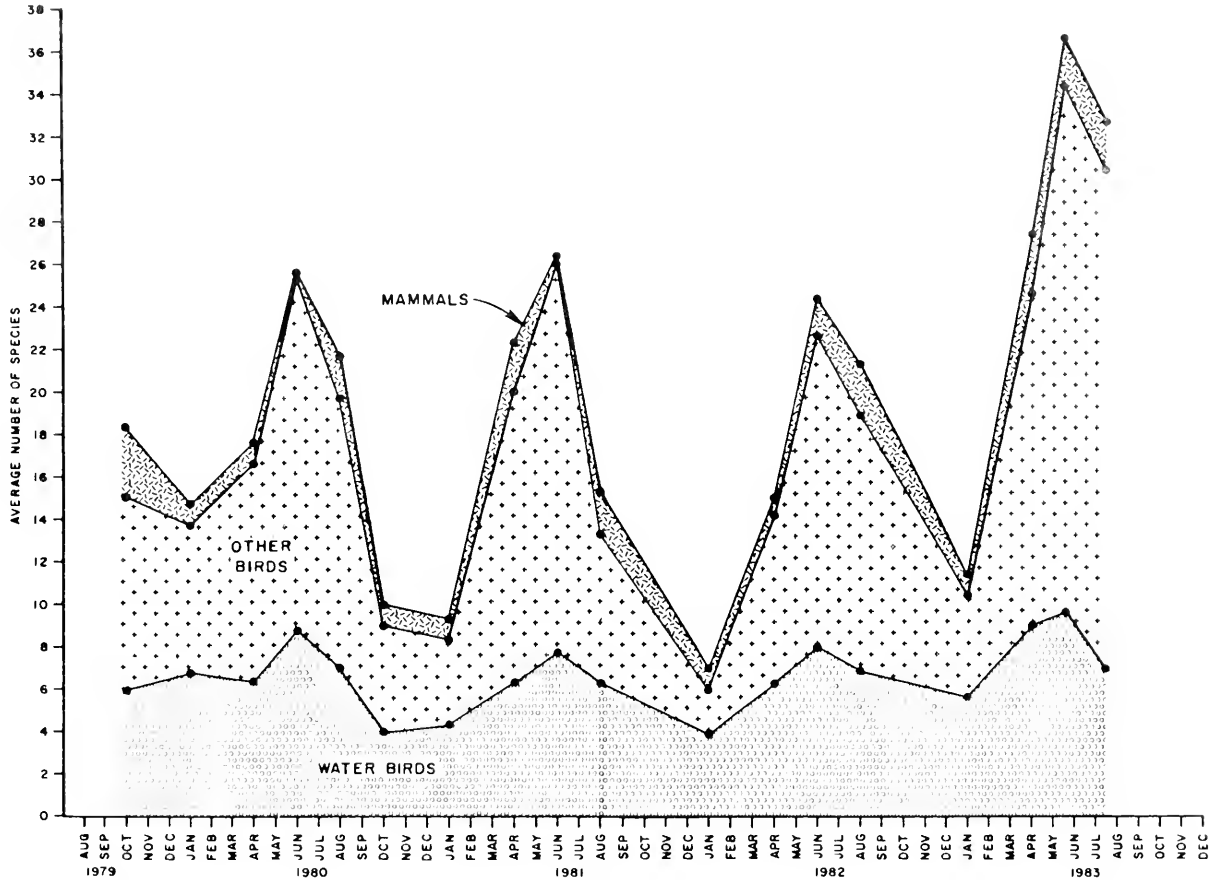


Figure 2. Seasonal variation in average numbers of species encountered during project area censuses, 1979-1983.

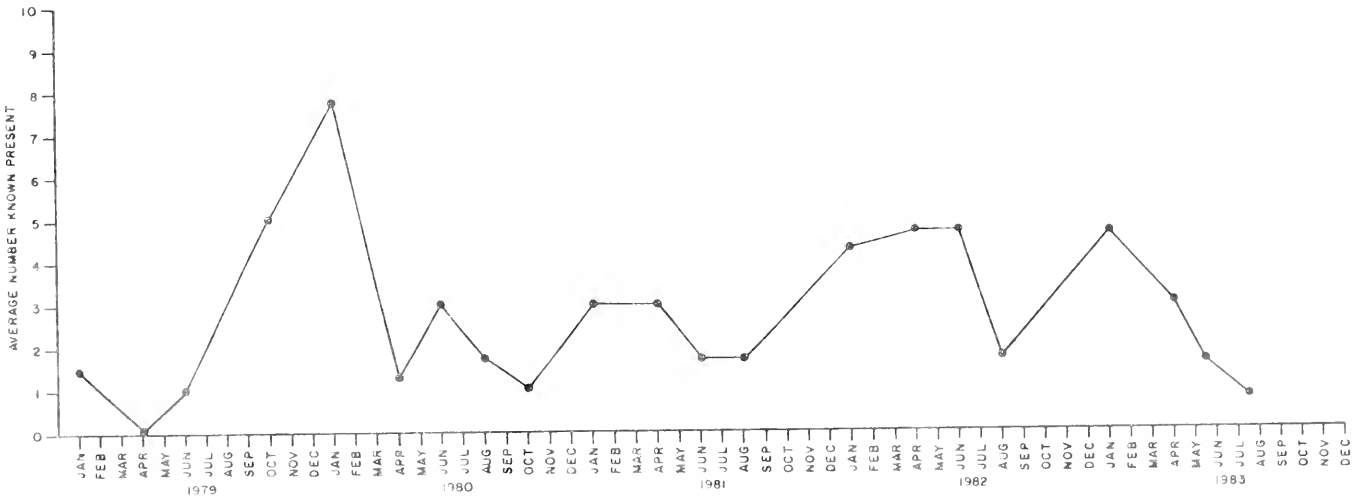


Figure 3. Seasonal variation in average numbers of dippers encountered during project area wildlife censuses, 1979-1983.

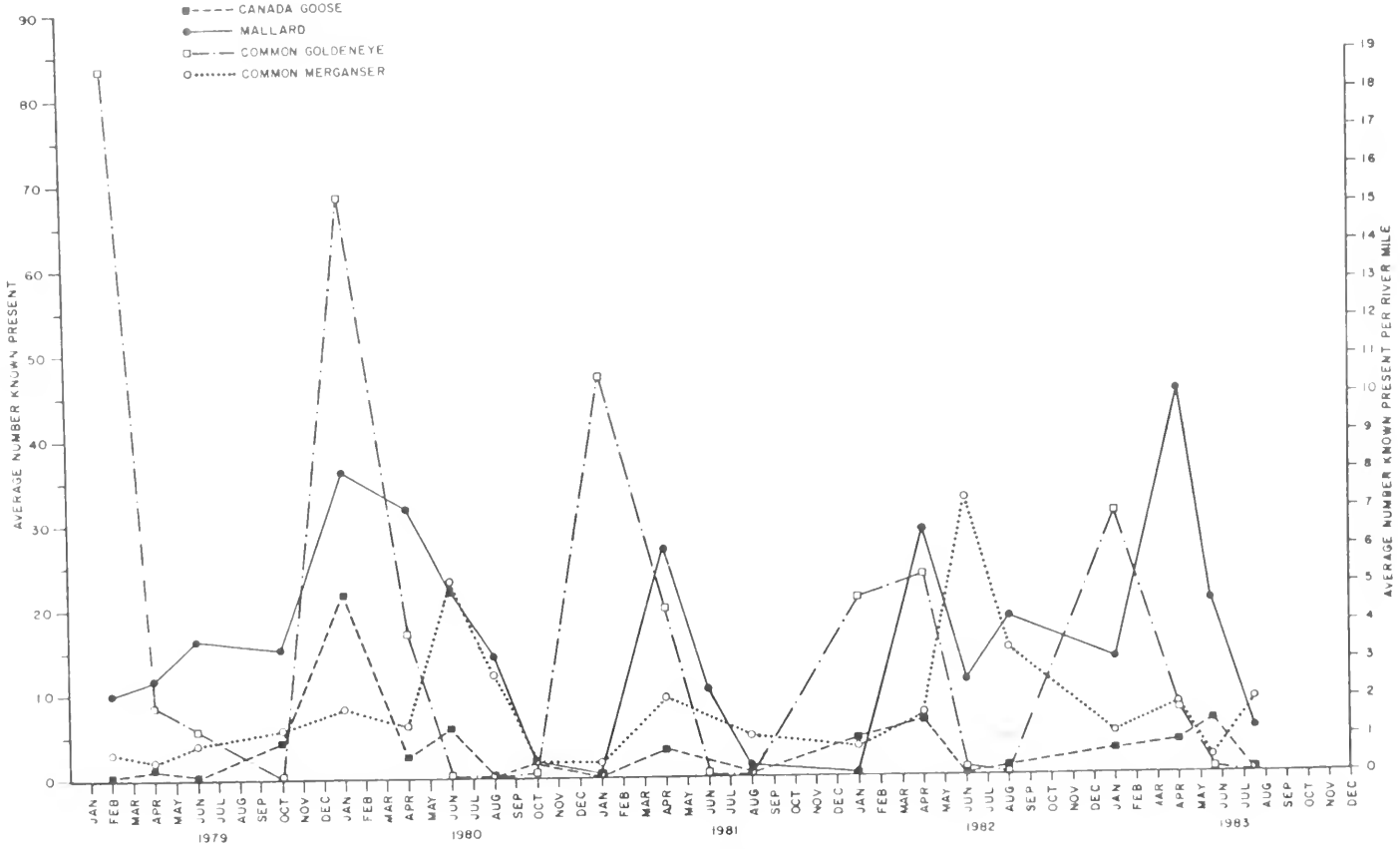


Figure 4. Seasonal variation in average numbers of Canada goose, mallard, common goldeneye, and common merganser encountered during project area wildlife censuses, 1979-1983.

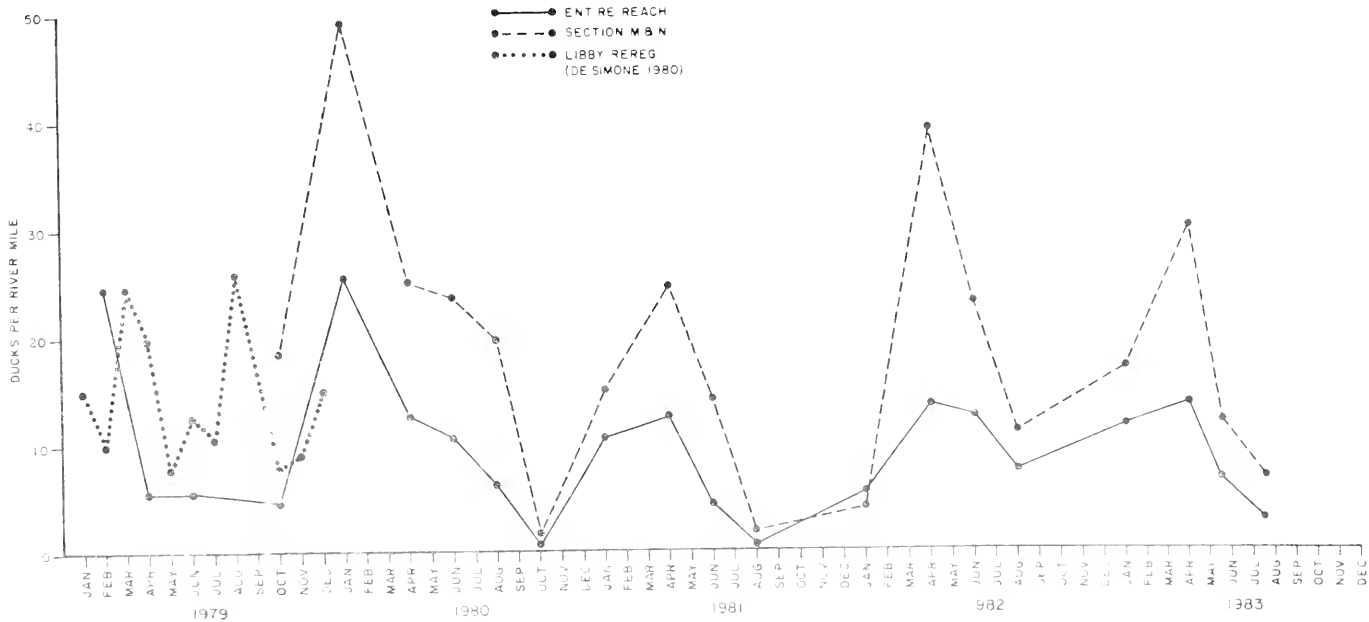


Figure 5. Seasonal variation in duck use of the project reach.

Bald Eagle Survey

During the monitoring study, bald eagles were observed in December 1982 and January 1983 (table 6).

Table 6. Bald eagle observations made during the monitoring study in the Kootenai Falls area, September 1982–September 1983.

Date	Observer[1]	Location (River Section)[2]	Minimum Number Known Present
December 30, 1982	PN	Q,S,T	3 adults[3]
December 31, 1982	PN	L,O,Q	4 adults
January 1, 1983	PN	P,T	4 adults
January 2, 1983	PN	N	1 adult

1 PN=Pat Nichols
2 Location codes as in appendix B
3 Observation made during bald eagle surveys

Harlequin Duck Special Studies

Information on harlequin ducks observed during the monitoring period is presented in table 7. During August 1982, DNRC searches for broods were unsuccessful.

Table 7. Harlequin duck observations in the Kootenai Falls area, September 1982-August 1983.

Date	Observer	Minimum number known present				Location (River Section)[1]
		Males	Females	Pairs	Total	
10-24-82	R. Hermsmeyer	1[2]	–	–	1	Below Libby Dam
4-12-83	L. Thompson	1	–	–	1	L
4-13-83	L. Thompson	1	–	–	1	I,J,M
4-14-83	L. Thompson	1	–	–	1	L
4-29-83	C. Wolf	1	1	1	2	L
5-1-83	R. Hermsmeyer	1	1	1	2	10 mi E Libby
5-7-83	R. Hermsmeyer	5	–	–	5	L
5-9-83[?]	C. Wolf	4	1	–	5	L
5-27-83	S. Kiser	2	–	–	2	L
5-28-83	S. Kiser	3	–	–	3	L
5-29-83	S. Kiser	4	–	–	4	L
5-30-83	S. Kiser	4	–	–	4	L
6-1-83	C. Wolf	1	1	1	2	L
6-11-83	C. Wolf	1	1	1	2	L
7-11-83	C. Wolf	1	1	1	2	L
7-27-83	C. Wolf	1	–	–	1	L

1 Abbreviations as defined in appendix B
2 In eclipse plumage

Bighorn Sheep Studies

Locations of bighorn sheep observations recorded during the roadside surveys are shown in figure 6. During censuses of bighorn sheep from U.S. Highway 2 (see table 8), the greatest number of sheep observed on any one census was 35 on May 27, 1983. Late May observations showed higher numbers than in June 1982. A notable census was that of July 30, 1983, when 30 sheep were observed. Prior to 1982, low numbers of sheep had been observed in the area in August. Figure 7 shows seasonal variation in average numbers of sheep observed during the roadside counts.

On April 13, 1983, a ground search on the Sheppard Meadows was conducted. Pellet groups (not identified to species) were observed in all meadows; the heaviest concentrations were in the downstream meadow in and around the orchard. Sheep tracks were observed all along the road that runs through the meadow.

On April 4, 1983, 133 sheep were counted during a MDFWP helicopter survey. A lamb-ewe ratio of 30:100 was obtained, and a ram-ewe ratio of 58:100 was obtained (Brown 1983).

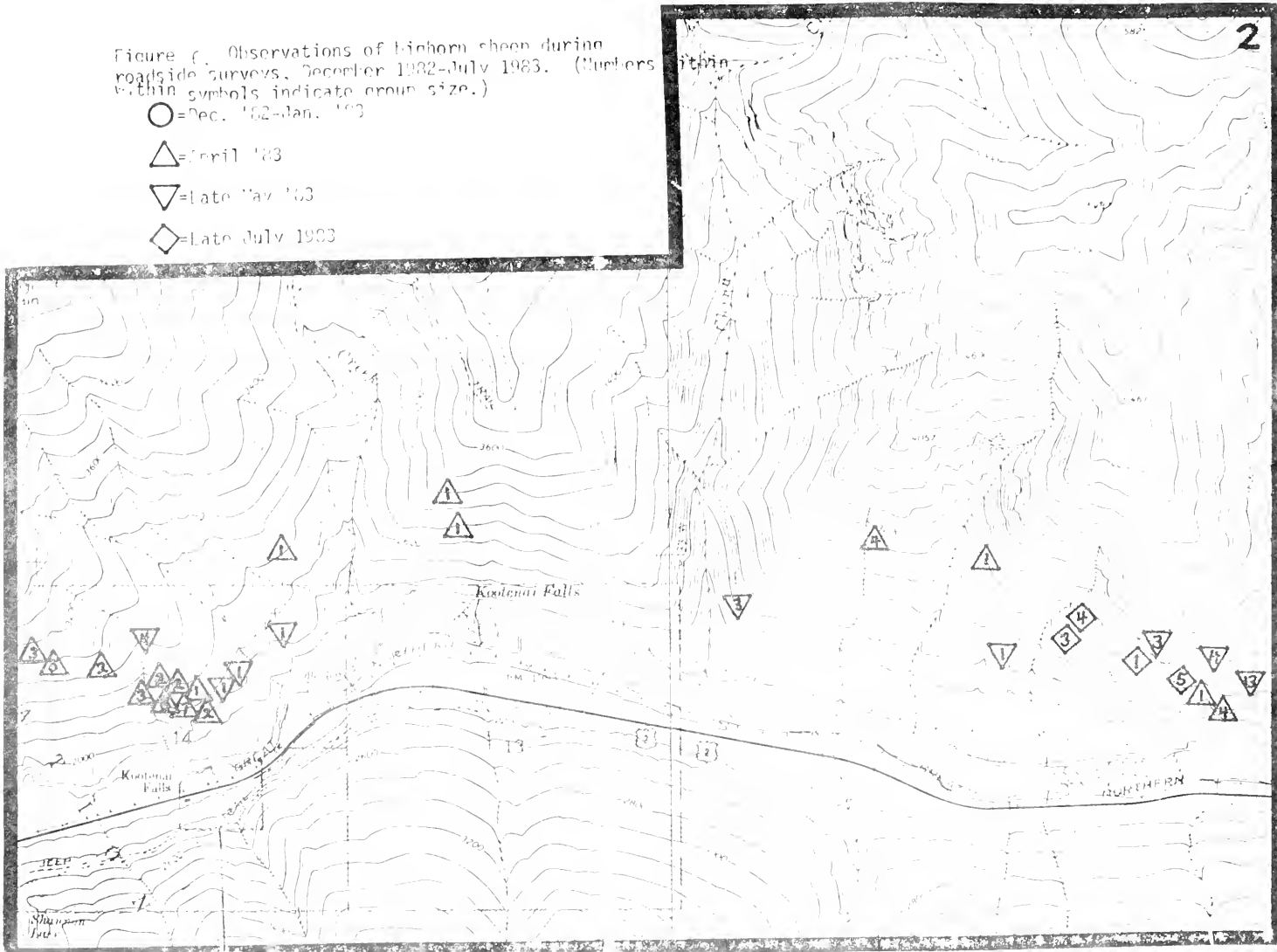


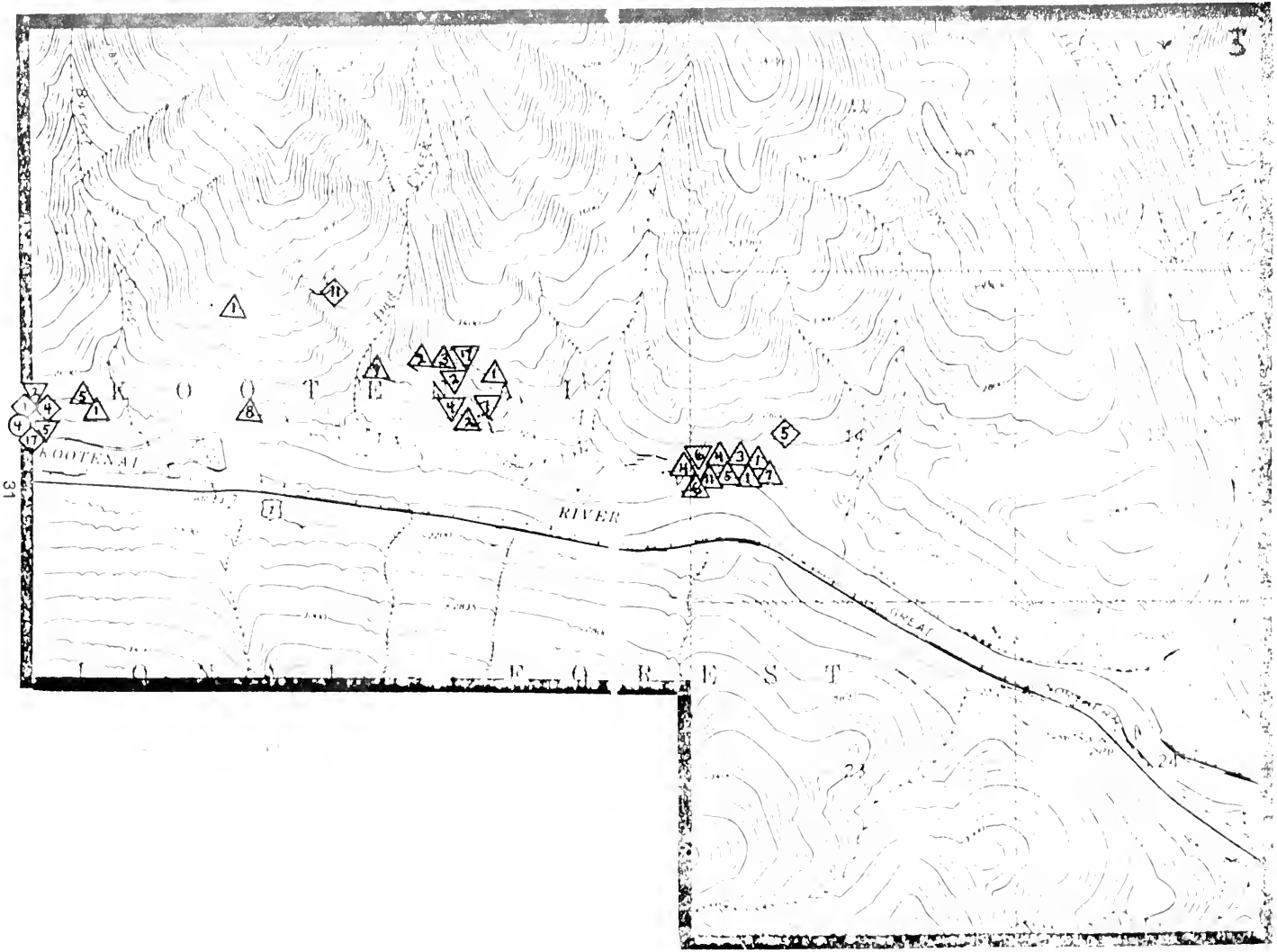
Figure 6. Observations of bighorn sheep during roadside surveys, December 1982-July 1983. (Numbers within symbols indicate group size.)

○=Dec. '82-Jan. '83

△=April '83

▽=Late May '83

◇=Late July 1983


3
KOOTENAI
RIVER
GREAT
NORTHERN
31
24

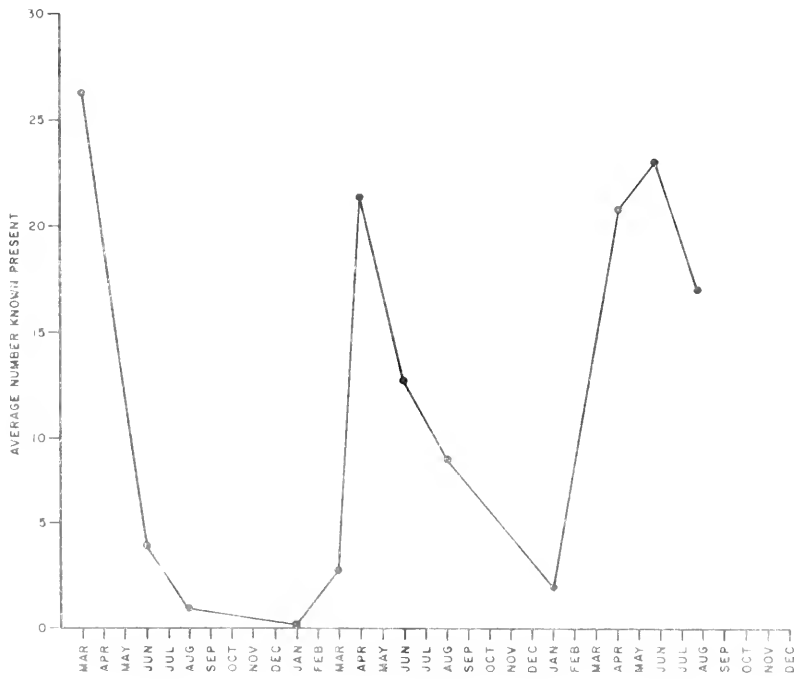


Figure 7. Seasonal variation in average numbers of bighorn sheep observed during roadside surveys.

Table 8. Results of bighorn sheep roadside surveys, Kootenai Falls study area, 1982-83.

Date	Observer[1]	Starting Time	Starting Station No.	No. Obs. Recorded[2]	Min. No. Sheep Known Present			
					Rams	Ewes	Other[3]	Total
Dec.31, 1982	PN	1245	1	4	2	1	1	4
Jan. 1, 1983	PN	1417	1	0	0	0	0	0
Jan. Average				2.0	1.0	0.5	0.5	2.0
April 11	PN	1710	1	29	12	3	10	25
April 12	PN	0712	10	38	10	5	17	32
April 12	PN	1208	10	9	4	5	0	9
April 12	PN	1644	10	38	8	2	13	23
April 13	PN	0600	1	40	18	4	5	27
April 13	PN	1430	1	13	6	0	3	9
April Average				27.8	9.7	3.2	8.0	20.8
May 27	SK	0530	1	35	4	16	15	35
May 28	SK	1354	1	26	1	7	18	26
May 29	SK	1840	1	12	0	6	2	8
Late May Average				24.3	1.7	9.7	11.7	23.0
July 29	SK	0800	1	20	2	6	12	20
July 30	SK	1830	1	30	0	8	22	30
July 31	SK	1430	10	1	0	0	1	1
Late July Average				17.0	0.7	4.7	11.7	17.0

1 PN=Pat Nichols, SK=Stacy Kiser
2 Includes multiple observations of the same individuals
3 Includes lambs and unclassified sheep

Amphibian and Reptile Search

During the 1982 monitoring period, one Coeur d'Alene salamander was found on April 11, 1983, and unidentified garter snakes were seen on May 28 and July 30, 1983.

ERRATUM

In table 5, p. 20, ONRC 1982, 46.3 should be entered for the March-April census of the Pine Siskin; zero (-) should be entered for the March-April census of the Dark-Eyed Junco.

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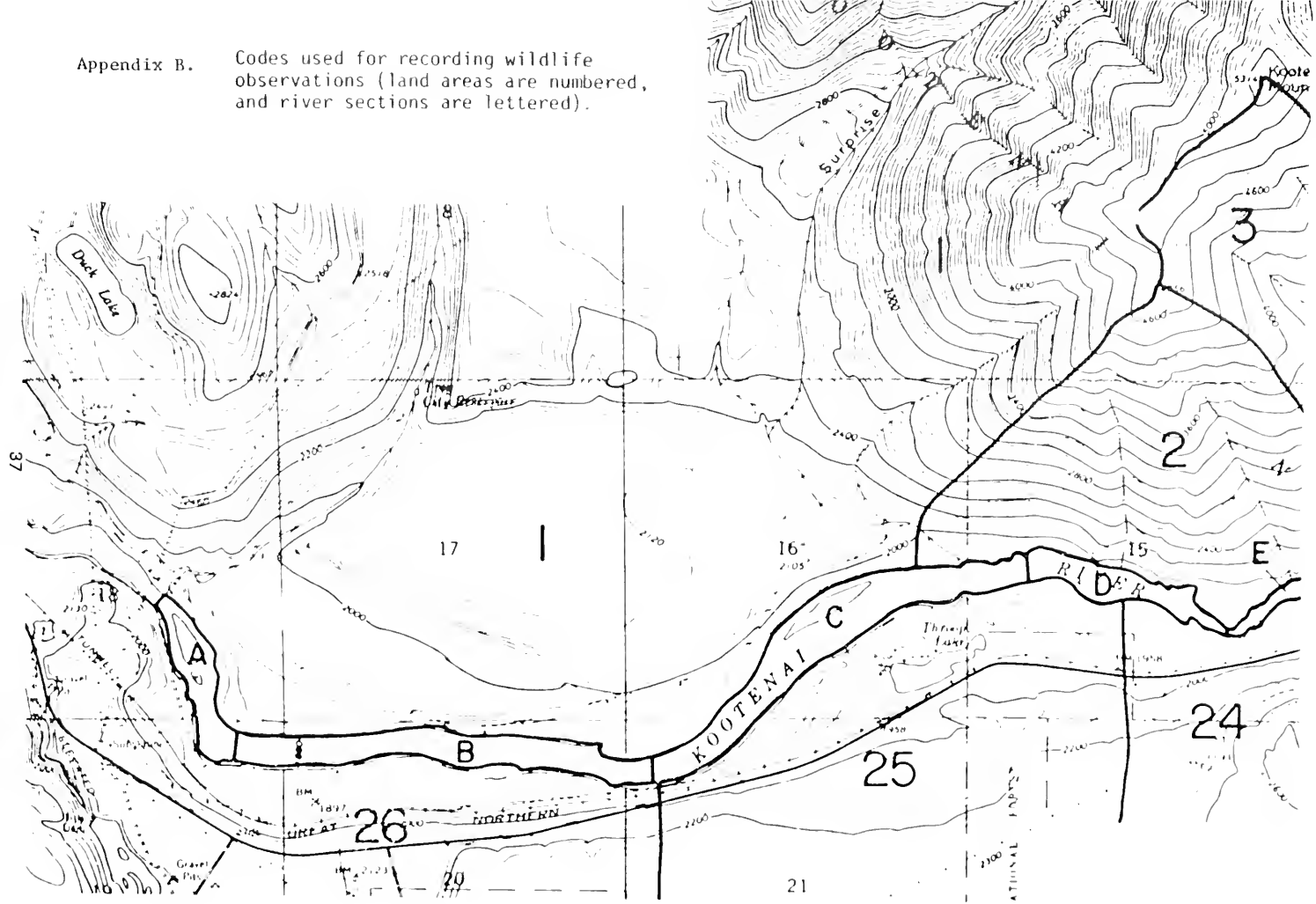
Appendix A. Habitat categories.

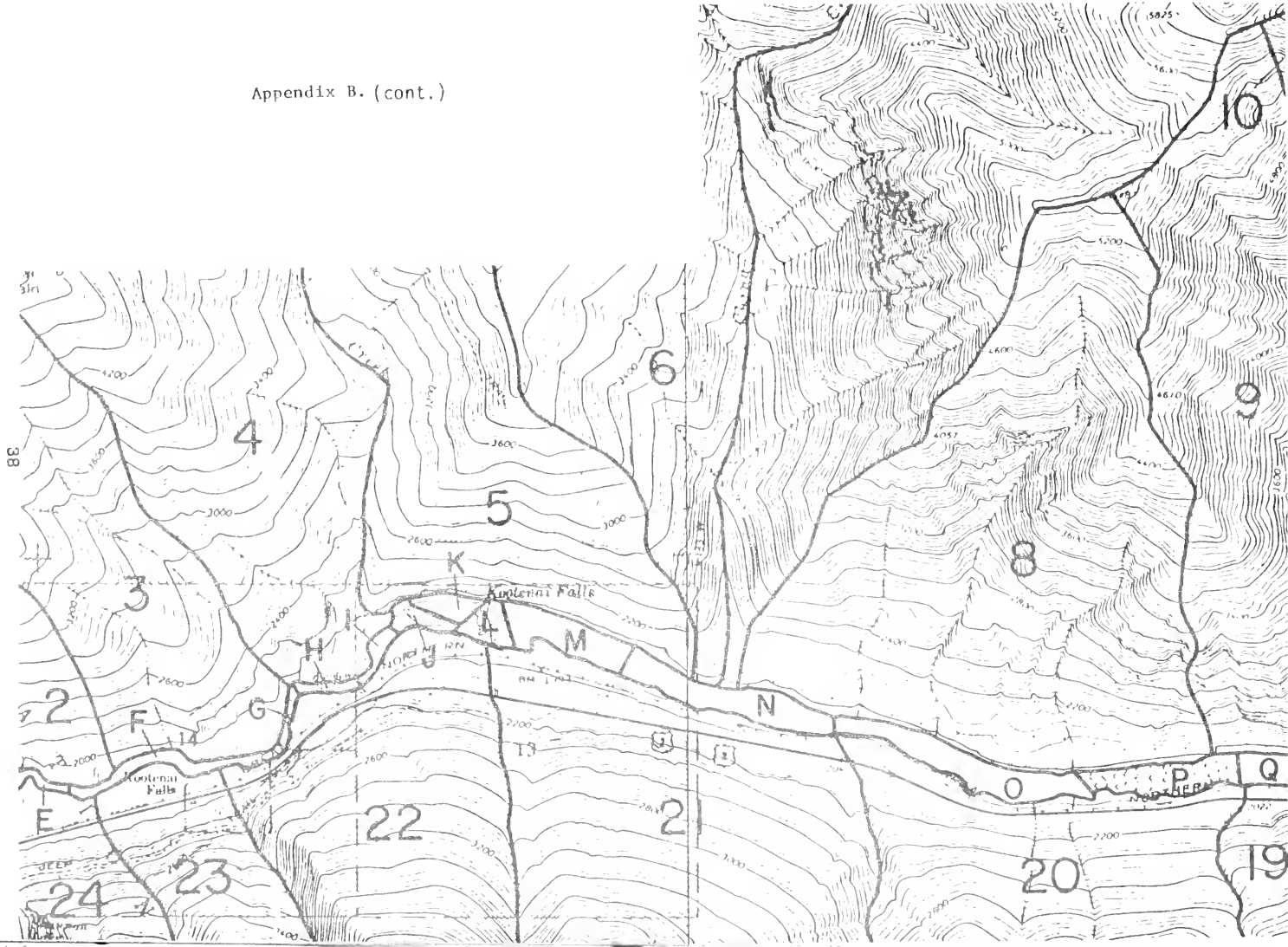
Habitat Category	Abbr.	Component Community Types[1]	Dominant Vegetation
WATER HABITATS			
Rapids	RA	-	None--includes fast water broken by shallow rocks
Falls	FA	-	None--includes fast water falling over falls, fast water above and below falls
Slow water	SW	-	None--includes relatively smooth, wide river sections, mostly upstream of falls, with no white water
Fast water	FW	-	None--includes narrowly constructed sections of river, mostly below falls having no white water
Aquatic Vegetation (rooted)	Av	17	Ranunculus aquatilus, Elodea canadensis
SPARSELY VEGETATED HABITATS			
Exposed rock or logjams (in river)	ER	R	None--includes exposed rock in river surrounded by water as well as logjams
Bare rock (upland)	BR	R	None--includes scoured rock along river canyon but surrounded by water
Gravel Bar	GB	12	Tanacetum vulgare, Agrostis alba, Equisetum arvense
Scree and Talus	ST	S	None--includes steep rockslides adjacent to river
Rocky outcrops (upland)	RO	15	Festuca scabrella, Physocarpus malvaceus, Philadelphus lewisii
GRASSLAND AND MARSH HABITATS			
Riparian grassland and hayfields	RG	14,20,25	Phleum pratense, Poa pratensis, Bromus inermis, Agropyron repens
Fescue Grassland	FG	16	Festuca scabrella, Agropyron spicatum, Balsamorhiza sagittata
Cattail Marsh	CM	13	Typha latifolia
SHRUB HABITATS			
Willow	WI	24	Salix spp., Tanacetum vulgare, Agrostis alba
Birch Alder-Dogwood	BA	21	Betula occidentalis, Alnus incana, Cornus stolonifera
Alder-Dogwood	AD	11	Alnus incana, Cornus stolonifera
FOREST HABITATS			
Riparian cottonwood[2]	RC	10	Populus trichocarpa, Alnus incana, Betula occidentalis
Seral (Deciduous)	SD	10,9,23	Populus trichocarpa (small),
Cottonwood (climax)[3]	C	9,6	Populus trichocarpa, Pseudotsuga menziesii, Thuja plicata
Ponderosa Pine - Douglas Fir[4]	PD	4,5	Pinus ponderosa, Pseudotsuga menziesii
Douglas Fir Seral	DS	6,8	Pseudotsuga menziesii, Pinus [illegible]
Douglas Fir Climax	DM	2,3	Pseudotsuga menziesii, Picea [illegible]
Douglas Fir Western Red Cedar	DW	1,7	Pseudotsuga menziesii, Thuja [illegible]
Seral (Coniferous	SC	1,9,23	Variable
other)			
Powerline right-of-way	PR	18	Betula [illegible]
Railroad right-of-way	RR	19	Berberis [illegible]
Orchard	OR	22	Pyrus malus
Open Air	OA	-	None--includes open air of river canyon

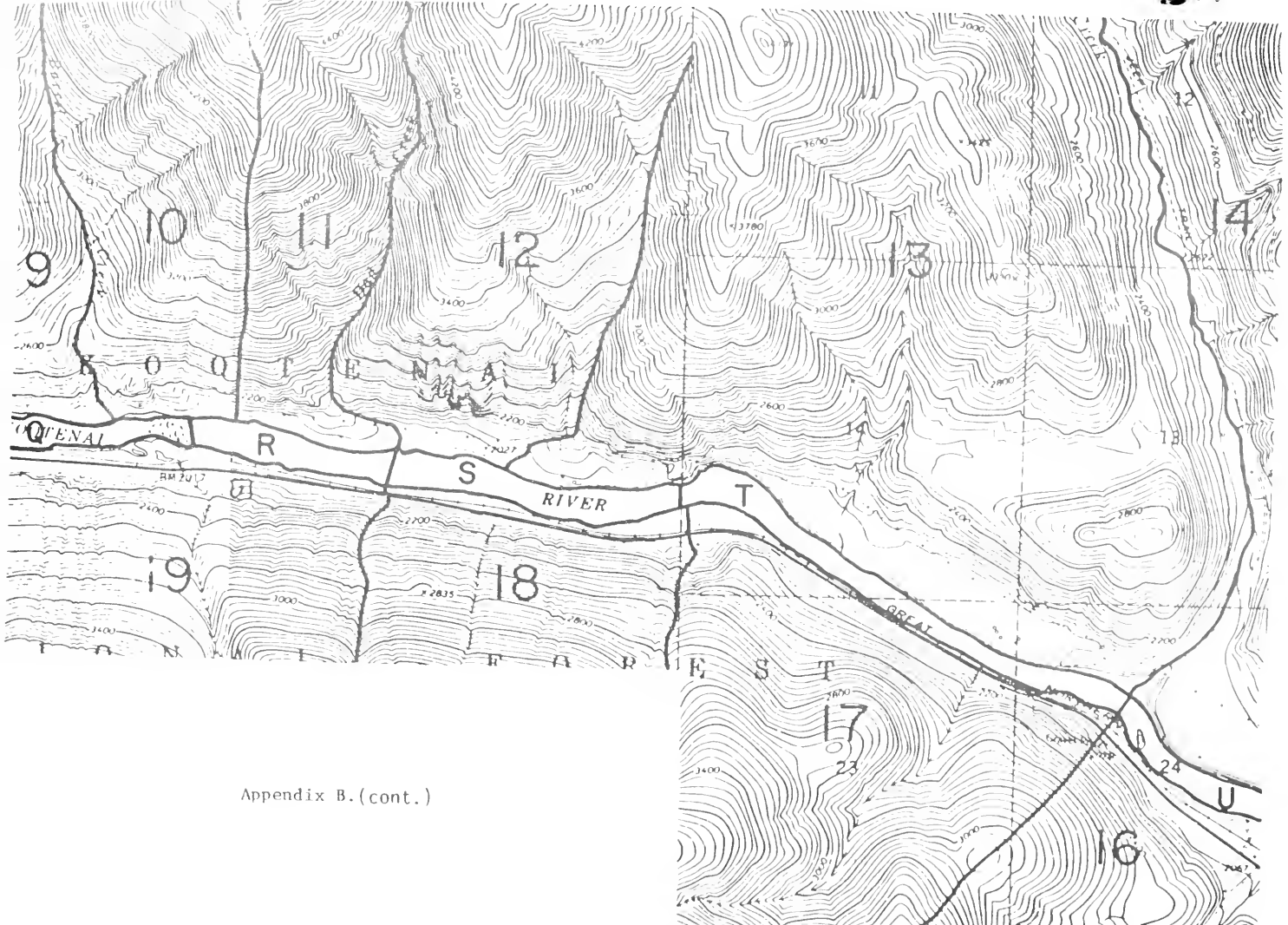
1 See UNRC 1979
2 Early Succession
3 Mid Succession
4 Late Succession

Appendix B. Codes used for recording wildlife observations (land areas are numbered, and river sections are lettered).



Appendix B. (cont.)





Appendix B.(cont.)

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1981-82

PLEASE RETURN

KOOTENAI FALLS

WILDLIFE

MONITORING STUDY

STATE DOCUMENTS COLLECTION
JUL
MONT
1515
HELENA, MT

Third Annual Report

for the period

September 2, 1981 - September 1, 1982

MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

ENERGY DIVISION

32 So. Ewing

Helena, MT 59620

December 1982

ACKNOWLEDGMENTS

This study was funded by Northern Lights, Inc. of Sandpoint, Idaho. Inventory data were gathered by Pat Nichols, of the Department of Natural Resources and Conservation. Larry Thompson, Biological Sciences Coordinator in the Facility Siting Bureau, DNRC, reviewed this report. Graphics were prepared by June Virag. William Phippen, DNRC, edited the report. The text was processed by Rose Ann Montgomery.

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APPENDICES

INTRODUCTION

Northern Lights, Inc. (NLI), a rural electric cooperative based in Sandpoint, Idaho, submitted an application to the Montana Department of Natural Resources and Conservation (DNRC) in 1980 to build a hydroelectric dam and generating plant, known as the Kootenai River Hydroelectric Project, in the Kootenai Falls area of Lincoln County, Montana. In 1978, NLI contracted with DNRC to conduct a baseline wildlife investigation in the project area. The results of that study, completed in September 1979, were published later that year (DNRC 1979).

To keep the wildlife data base current and to determine the nature of year-to-year variations in wildlife use of the project area, NLI contracted with DNRC in October 1979 to monitor wildlife in the study area (see DNRC 1979 for a study plan). This study would provide a data base for documenting project-related impacts and for determining the success of mitigation and compensation programs, should the Board of Natural Resources and Conservation issue a certificate for the project at the Kootenai Falls site.

The first annual report (DNRC 1981a) documented results from the first year of the Kootenai Falls wildlife monitoring study (September 2, 1979, through September 1, 1980). The area monitored in that study was the same as the area inventoried during the original baseline study (DNRC 1979, pp. 2-3), although some surveys also were conducted along U.S. Highway 2 between Libby and Troy.

The second annual report (DNRC 1981b) highlighted results from the second year of the Kootenai Falls wildlife monitoring study (September 1, 1980, through August 31, 1981). The area investigated during that monitoring period was basically the same as studiad during the first monitoring period. Some modifications in monitoring study design, as suggested in the first annual report (DNRC 1981a) were employed in the second year of monitoring.

This third annual report presents the results from the third year of the wildlife monitoring study (September 1, 1982, through August 31, 1982). The study area was the same as in the past two years of monitoring with some modifications in study design, as suggested in the second annual report.

METHODS

Field techniques and analytical methods used in this study were as described in the baseline studies report (DNRC 1979, pp. 109-112) and the first annual report (DNRC 1981a). A brief summary of methods employed for individual study segments follows (see table 1).

Table 1. Schedule of September 1981 - September 1982 field work, Kootenai Falls wildlife monitoring study.

Dates	Observer[1]	Type of Field Work
January 6-9, 1982	PN	Riparian wildlife census, bald eagle survey, bighorn sheep counts.
March 4-6, 1982	PN	Bighorn sheep counts, meadow observation
March 29-31, April 1-3, 1982	PN	Riparian wildlife census, bighorn sheep tracking, bighorn sheep count, amphibian and reptile search
June 12-17, 1982	PN	Riparian wildlife census, harlequin duck survey, bighorn sheep count, amphibian and reptile search.
August 2-5, 1982	PN	Riparian wildlife census, harlequin duck survey, bighorn sheep counts, amphibian and reptile search, small mammal trapping.

1 PN = Pat Nichols

Species List Update

The species lists presented in the baseline report (DNRC 1979) were updated.

Project Area Wildlife Census

This census was designed to collect data that would allow comparison of wildlife use of the project area between months and between years. The methods used were patterned after the standard winter bird study (Kolb 1965) and breeding bird census techniques (Hall 1964, Van Velzen 1972) used in the original inventory, but were expanded to include all vertebrate species. The area censused included: the entire Kootenai River and its shorelines from 50 m (164 ft) below the proposed dam outlet to the upper end of the proposed reservoir; the land that would be inundated by the dam at a forebay elevation of 610 m (2,000 ft); the land that would be affected by railroad relocation; and all remaining land between U.S. Highway 2 and the Kootenai River (see appendix B). The entire area was censused for three consecutive days during each month of January, April, June, and August 1982, following the instructions outlined in the baseline report (DNRC 1979, appendix F).

Bald Eagle Survey

The Kootenai River between Libby and Troy was surveyed for bald eagles on January 6 and 8, 1982 (1 count each day), following the methods of Meyer (1979). Observations were made from U.S. Highway 2. Bald eagles seen during project area wildlife censuses and other monitoring field work also were recorded.

Harlequin Duck Special Studies

In addition to surveys made during project area wildlife censuses, special searches of the Kootenai Falls area for harlequin ducks were conducted in June and August. In June, emphasis was placed on determining the total harlequin duck population and the number of pairs present in the project area; in August, emphasis was placed on locating broods.

Bighorn Sheep Studies

During the study period, several different methods were used to gather information on bighorn sheep. These methods are described below.

Bighorn sheep were observed from strategic viewpoints along U.S. Highway 2 during each of the five survey field trips (table 1). The cliffs north of the Kootenai River within the project area and within 1 mile (upstream) of the project area were surveyed with a spotting scope. The researchers followed a controlled observation schedule. During each survey, the north bank of the river was searched for 10 minutes from each of 10 observation points along U.S. Highway 2. Three such surveys were conducted in January, six in early March, five in late March-early April, three in June, and three in August. Observations of bighorn sheep made during these surveys, as well as those made in conjunction with other field work, were recorded on maps and standard data sheets. Observations of deer also were recorded. In April, the Sheppard Meadows (DNRC 1981a) were searched for tracks or other evidence of bighorn sheep use.

Amphibian and Reptile Search

During April, June, and August, at least four hours each month were spent searching likely habitat in the project area for amphibians and reptiles.

Small Mammal Trapping

Two snap-trap lines (each consisting of 25 stations with two traps per station) were run for three consecutive nights (August 2-4, 1982), one in riparian cottonwoods at the head of Kootenai Falls, and the other in adjacent riparian grassland. Capture data were recorded on standard data sheets.

WEATHER

Table 2 summarizes weather data collected at the NOAA Libby recording station (Libby 1 NE Ranger Station) for the period September 1981 to August 1982. The data show that the winter of 1981-82 was warmer and wetter than normal. Average monthly temperatures ranged from -2.7 to +3.5 degrees Fahrenheit (averaging +1.7 degrees) of normal from November through March, and monthly precipitation averaged 0.8 inches above normal. Snowfall, which totalled 46.9 inches, occurred during the period November through April. Although data on average snowfall at this recording station are not available, snowfall during the same period the previous year, November 1980 through April 1981, totalled 21.5 inches. Snow depths in 1981-82 were relatively high; the greatest depth (26.7 inches) was recorded in January 1982. During the winter of 1980-81, the maximum snow depth (10 inches) occurred in December.

Table 2. Summary of weather parameters at Libby, September 1981–July 1982

Month	Temperature[1] (degrees F.)	Precipitation[2] (inches)	Snowfall (inches)	Maximum Snow Depth on Ground (inches)
September 1981	57.1(+0.3)	0.8(-0.5)	0	0
October 1981	43.4(-2.1)	0.7(-1.3)	0	0
November 1981	35.4(+2.2)	2.6(+0.3)	1.0	1
December 1981	28.0(+2.3)	2.6(+0.3)	12.7	7
January 1982	25.4(+3.0)	2.5(+0.1)	26.7	18
February 1982	27.4(-2.7)	3.1(+1.6)	5.1	15
March 1982	39.2(+3.5)	2.3(+1.0)	*	7
April 1982	42.5(-2.8)	2.6(+1.5)	1.4	0
May 1982	52.0(-2.0)	1.7(+0.2)	0	0
June 1982	63.9(+3.6)	2.9(+1.1)	0	0
July 1982	64.5(-2.5)	1.3(+0.6)	0	0

1 Monthly average (departure from normal)
2 Total (departure from normal)
* Data unavailable

RESULTS AND DISCUSSION

Species List Update

During this monitoring period, 52 species of vertebrates were observed or trapped--47 birds and 5 mammals. These included two new species--the boreal chickadee and the pine grosbeak. These new species bring the total number of species observed since the studies began in 1978 to 118 (1 amphibian, 1 reptile, 88 birds, and 28 mammals). Data on these species are summarized in tables 3 and 4.

Table 3. Summary of data collected on amphibian, reptile, and bird species observed on the Kootenai Falls study area, January 1978 through August 1982

Species	Habitat[1]	Where Observed[2]	Status and Abundance[3] This Study	Skaar[4] (1980)	J A N	F E B	M A R	A P R	M A Y	J U N	J U L	A U G	S E P	O C T	N O V	O E C
AMPHIBIANS																
Coeur D'Alene Salamander *Plathadon yandykei*	RO	22	NA	NA	–	–	–	–	–	–	–	A				
REPTILES																
Garter Snake *Thamnophis* spp.	GB	P,20	NA	NA	–	–	–	–	–	J	–	–		–	–	–
BIRDS																
Great Blue Heron *Ardea herodias*	GB,SW,ER	C,D,F,J,H,L,M,N, O,P,Q	s-U	Bw	J	–	–	A	M	J	J	A	–	O		–
Canada Goose *Branta canadensis*	SW,GB,RG	C,D,E,M,N	B-C w-c	Bw	J	F	M	A	M	J	–	A				
Mallard *Anas platyrhynchos*	SW,FW,GB,FA,ER,AV, CM	D,F,H,L,M,N, O,P,Q,R,S,T	W-A,B-A	CW	J	F	M	A	M	J	J	A	S		N	–
Gadwall *Anas strepera*	GB,SW	O	fm-U	b		–	–	–	–	–	–		–	O	–	–
Green-winged Teal *Anas crecca*	GB,SW	O	sm-U	Bw	–	–	–	A	–	–	–		–		–	–
Blue-winged Teal *Anas discors*	GB,SW	M,O	s-R	B				–	–	o						
American Wigeon *Anas americana*	SW,GB	M	sm-R	B	–	–	–	A	M	–	–	–			–	
Common Goldeneye *Bucephala clangula*	SW,ER,FW,GB,FA	E,F,H,M,N,O, P,Q,R,S,T	W-A,b-A	BW	J	F	M	A	M	J	–	–			–	
Barrow's Goldeneye *Bucephala islandica*	SW,ER	M	b-U	BW	–	–	–	A	M							
Bufflehead *Bucephala albeola*	SW,AV	M	s-R	Bw			–		–			A			–	–
Herlequin Duck *Histrionicus histrionicus*	FA,FW,ER,BR,SW	F,G,H,J,L,M,N	B-J	b	–	–	–	A	M	J	J	A		O	–	–

Table 3. (continued)

Species	Habitat[1]	Where Observed[2]	Status and Abundance[3] This Study	Skaar[4] (1980)	J A N	F E B	M A R	A P R	M A Y	J U N	J U L	A U G	S E P	O C T	N O V	D E C
Hooded Merganser *Lophodytes cucullatus*	SW	N,O,P	w-R	Bw	J	-	-	-	-	-	-	-	-			-
Common Merganser *Mergus merganser*	FW,GB,SW,AV,ER	D,F,G,H,M,N,O,P Q,R,S	W-U,B A	Bw	J	F	M	A	M	J	J	A	S	O	N	-
Red-tailed Hawk *Buteo jamaicensis*	PO,OA	2,4,8	w-R,S U	B	-	F		-		J	-	A	-	O		
Golden Eagle *Aquila chrysaetos*	PO	6,20	s-R	BW	-	-	-	A								
Bald Eagle *Haliaeetus leucocephalus*	SO,RC,OS,SC,CC, PO,OA	8,O,F,F,H,M,V, 8,9,13,21	W-U,s-U	bW	J	F	M	A	-	J	J	-	-	O	N	
Osprey *Pandion haliaetus*	OA,SW,FW,SO,CC	O,E,M,N,O,P,Q, 7,19,20,21,22,24	b-C	B	-	-	M	A	M	J	J	A	S			
Merlin *Falco columbarius*	RO,OS	22	w-u,b-U	bw	J	-				J						
American Kestrel *Falco sparverius*	SC,RO,CC,OS,SO	21,22	B-U	Bw	-	-	-	-	M	J	J	-				
Ruffed Grouse *Bonasa umbellus*	OW,OS	8,18,21,22,23	B-U,W-U	BW	-	F	-	A	M	J	-	-		O	-	-
Killdeer *Charadrius vociferus*	GB	O,P,25	B U	BW	J	-	-	A	M	J	-	-				
Spotted Sandpiper *Actitus macularia*	GB,ER,FA	F,J,K,L,M,N,O	b-C	B	-	-	-	-	M	J	J	A	-			-
California Gull *Larus californicus*	SW,OA,*GB,RO*	M	s-u	-	-					J	J	A				
Ring-billed Gull *Larus delawarensis*	SW,OA,ER	I,L	t-U,fm-R	tw	-	-	-				J	-		O		

Table 3. (continued)

Species	Habitat[1]	Where Observed[2]	Status and Abundance[3] This Study	Skaar[4] (1980)	J A N	F E B	M A R	A P R	M A Y	J U N	J U L	A U G	S E P	O C T	N O V	D E C
Mourning Dove *Zenaida macroura*	RR,DS,FK	21,20	w-R,b-U	bw	–	F	–	–	M	J	–	A	–		–	–
Common Nighthawk *Chordeiles minor*	FA	L	s-U	B	–	–	–	–	–		J	A	–		–	–
Black Swift *Cypseloides niger*	OA	L	s-R	b	–	–	–	–	–	–	J	A	–		–	–
Vaux's Swift *Chaetura vauxi*	OA	L,M	sm-U	b		–	–	–	M		–		–			–
White-throated Swift *Aeronautes saxatilis*	OA	M	s-R	b	–	–	–	–				A			–	–
Calliope Hummingbird *Stellula calliope*	PR,RH,RO,DS	22	[illegible]	b	–		–	–	–	–	[illegible]	–				
Rufous Hummingbird *Selasphorus rufus*	DS	21	s-U	B				–	M	J	J			–	–	–
Belted Kingfisher *Megaceryle alcyon*	SW	D,N	w-R,s-[illegible]	BW	–	F	–	–	M	–	J	A	–	–	–	
Common Flicker *Colaptes auritus*	RC,CC,SD,DW,DN	21	b-U	BW	–		–	A	M	J	J	A	–	D	–	–
Pileated Woodpecker *Dryocopus pileatus*	DW	18,22	w-R,s-R	bW	J		–	A							–	–
Hairy Woodpecker *Picoides villosus*	DW,RC,CC,SD	18,21	w-R,s-R	DW	J		–	–	M			–	–	–	–	–
Downey Woodpecker *Picoides pubescens*	RR	21	t-r,s-R	bW	[illegible]			–		–		–		[illegible]		–
Willow Flycatcher *Empidonax traillii*	WI,BA	10,21	b-U	b	–			–	M	J					–	–

Table 3. (continued)

Species	Habitat[1]	Where Observed[2]	Status and Abundance[3] This Study	Skaar[4] (1980)	J A N	F E B	M A R	A P R	M A Y	J U N	J U L	A U G	S E P	O C T	N O V	D E C
Flycatcher (sp. undeterm.) *Empidonax* sp.	DW,AD,DS,DN	17,19,21,22	b-U		–	–	–	–	M	J	–	–	–	–	–	–
Violet-green Swallow *Tachycineta thalassina*	OA,PR,BR	F,G,H,I,J,K,L,M, 21	b-A	B	–	–	–	A	M	J	J	*A*	–	–	–	–
Tree Swallow *Iridoprocne bicolor*	OA,SO	L,M,21	B-U	B	–	–	–		M	J	J	–	–	–		–
Rough-winged Swallow *Stelgidopteryx ruficollis*	OA,BR	F,G	B-U	B	–	–	–	–	M	J	J	–	–	–		–
Barn Swallow *Hirundo rustica*	OA,PR	21	b-U	B	–	–	–	–	–	J	–	*A*	–			
Stellar's Jay *Cyanocitta stelleria*	DW	22	fm-R	bW	–	–	–	*A*			–	–	–	O	–	–
Common Raven *Corvus corax*	DW,PO,RO,OS,DN,OA, RC,CC	M,B,10,26,25,22, 21,20	W-C,B-C	Bw	J	–	–	A	M	J	J	*A*	–	O	–	–
Common Crow *Corvus brachyrhynchos*	DW,PO,OS,DN,OA,ER, RC,CC	L,B,17,18,19,20, 21,22,23,24	W-A,b-A	b	J	F	M	A	M	J	J	A	–	O	–	–
Black-capped Chickadee *Parus atricapillus*	DW,OS,CC,BA,SD,ON	19,20,21,22,23,24	W-A,B-A	BW	J	F	M	A	M	J	J	A	–	O	–	–
Mountain Chickadee *Parus gambeli*	DW	22	fm-R	BW	–	–	–	–	–	–	–	–	–	O	–	–
Boreal Chickadee *Parus hudsonicus*	*BA*	19	*t-r*	*bw*	–	–	–	*A*	–	–	–	–	–	–	–	–
Chestnut-backed Chickadee *Parus rufescens*	OS,*BA*	21	w-U,*t-U*	bw	J	–	–	*A*							–	–
Red-breasted Nuthatch *Sitta canadensis*	DW,OS	22	w-R,s-R	BW	–	–	M	–	–	J	–	–		O	–	–
Brown Creeper *Certhia familiaris*	DW	22	w-R	BW		F	–	–	–	–	–			–	–	–

Table 3. (continued)

Species	Habitat[1]	Where Observed[2]	Status and Abundance[3] This Study	Skaar[4] (1980)	J A N	F E B	M A R	A P R	M A Y	J U N	J U L	A U G	S E P	O C T	N O V	D E C
Dipper *Cinclus mexicanus*	BA,FA,EB,GB,FW	F,H,I,J,L,P,Q,21	W-C,b-C	BW	J	F	M	A	M	J	J	A	S	O	N	D
Canyon Wren *Catherpes mexicanus*	DN	9	b-U							J	-					
Winter Wren *Troglodytes troglodytes*	DW	22	s-R	BW					M	J	-					
Gray Catbird *Dumetella carolinensis*	BA,AD	13,21	[illegible]	[illegible]						J						
American Robin *Turdus migratorius*	DW,DS,CC,BC,PD,DN, BA,BB,GA	1,4,5,8,13,20, 21,22	[illegible]	BW			M	A	M	J	J	A				
Varied Thrush *Ixoreus naevius*	DW,DN	8,20,21,22	[illegible]	Bw			M	A	M	J	-					
Swainson's Thrush *Catharus ustulatus*	DS,DW,DN	3,4,13,20,21,22	[illegible]	B				J	M	J	J					
Veery *Catharus fuscescens*	CC	21	b-U	[illegible]								A				
Mountain Bluebird *Sialia currucoides*	AU,BB	22,J	[illegible]	B				A		J	-					
Townsend's Solitaire *Myadestes townsendi*	PD,BD,CC	4,21	w-U,s-R	BW			M	J		J	-	-				
Golden-crowned Kinglet *Regulus satrapa*	DW	3,4,17,15,20,21, 22,23,24,25	W-A,b-A	BW	J	F	M	A	M	J	[illegible]					
Ruby-crowned Kinglet *Regulus calendula*	DW,CC	21	b-U	B					M							
Cedar Waxwing *Bombycilla cedrorum*	DS,PD,BA	20,22	[illegible]	Bw						J	[illegible]					
Northern Shrike *Lanius excubitor*	CC	19	w-R	+W												

Table 3. (continued)

Species	Habitat[1]	Where Observed[2]	Status and Abundance[3] This Study	Skaar[4] (1980)	J A N	F E B	M A R	A P R	M A Y	J U N	J U L	A U G	S E P	O C T	N O V	D E C
Red-eyed Vireo *Vireo olivaceus*	DS,DW,DN,BA	9,20,21	b-U	U	-	-	-			J	J					
Warbling Vireo *Vireo gilvus*	AD,CC,RR,DW,BA	21,22	b-U	B	-	-	-			J	J	-	-			
Orange-crowned Warbler *Vermivora celata*	BA,CC,PR,DS	22	b-R	b	-	-					J					
Nashville Warbler *Vermivora ruficapilla*	BA,CC,DS	20,21,22	b-C	B	-				M	J						
Yellow Warbler *Dendroica petechia*	DS,WI,BA,CC	20,21,22,23	b-C	B	-			A	M	J	-	A				
Yellow-rumped Warbler *Dendroica coronata*	DW,DS,CC,DN	3,4,5,20,21,22	b-A	B	-		-	A	M	J	J	A				
Townsend's Warbler *Dendroica townsendi*	DW	21,22	b-U	B		-	-	-		J	J					
MacGillivray's Warbler *Oporornis tolmiei*	DW,RR,BA,CC	18,20,21,22	b-C	B			-	A	M	J	J					
American Redstart *Setophaga ruticilla*	BA,DW,CC	22	b-U	B		-				J	J					
Western Meadowlark *Sturnella neglecta*	RG	21	b-R	BW	-									U	-	
Brown-headed Cowbird *Molothrus ater*	PR,ER,DS,CC	L,M,20,21	b-C	B					M	J	J					
Western Tanager *Piranga ludoviciana*	DW,DN,DS,PR,CC	20,21,22	b-U	B	-	-	-			J	J	-	-	-	-	
Lazuli Bunting *Passerina amoena*	CC,DW,DS	21	b-R	b						J						
Pine Grosbeak *Pinicola enucleator*	CC	M	b-A	BW						-		A				

Table 3. (continued)

Species	Habitat[1]	Where Observed[2]	Status and Abundance[3] This Study	Skaar[4] (1980)	J A N	F E B	M A R	A P R	M A Y	J U N	J U L	A U G	S E P	O C T	N O V	D E C
Pine Siskin *Carduelis pinus*	PD,DW,DN,CC	20,21	B-C	bW				A	M	J	-	A				
American Goldfinch *Carduelis tristis*	CC,RG,DS,DA	M	s-P	bW						J						
Red Crossbill *Loxia curvirostra*	DS,DW,CC,DN	19	B-C	bW			-			J						
Rufous-sided Towhee *Pipilo erythrophthalmus*	BA	21	b-U	bW	-	-		A			-		-	-	-	
Dark-eyed Junco *Junco hyemalis*	DW,DN,PD,DS,CC	3,4,19,20,21,22,23	B-C	BW				A	M							
Chipping Sparrow *Spizella passerina*	DS,DW,CC,DN	4,19,20,21,22	B-C	B				-	M							
Lincoln's Sparrow *Melospiza lincolnii*	DW,DS	21,22	s-R	b					M	-	-	-	-			
Song Sparrow *Melospiza melodia*	RR,RC,DS,PR,WT,BA	10,18,19,20,21,22	W-U,B-A	BW		F	M	A	M	J	J	A	-	-	N	
Snow Bunting *Plectrophenax nivalis*	PR	21	w-U	wt												

Table 3. (continued)

Footnotes:

1 Habitat categories abbreviations as in appendix A.

2 See appendix B for location codes of river stretches (letters) and upland areas (numbers).

3 Status: W – Overwinters in area (at least one record each during January and February).
w – Transient in winter.
sm – Spring migrant.
fm – Fall migrant.
B – Breeds on area (nest or dependent young located).
b – Probably breeds on area (territorial males or pairs located).
s – Summers on area in small numbers but no evidence of breeding.
t – Occurs but no evidence of breeding.

Abundance: A – Abundant; found in large numbers in appropriate habitats.
C – Common; found in moderate numbers in appropriate habitats; 15 to 50 registrations.
U – Uncommon; small numbers in appropriate habitats; 2 to 15 registrations.
R – Rare; few sightings; 1 or 2 registrations.

4 Indicates status of species in latilong No. 1, as reported by Skaar (1980).

5 Months when seen are indicated by letter abbreviations in sequence, January through December (Note: Very little field work was carried out in September and November; none was carried out in December).

New entries are listed in italics.

Table 4. Summary of data collected on general habitat use and local distribution of mammals observed on the Kootenai Falls study area, January 1978-August 1982.

Common Name	Scientific Name	General Habitat Description[1]	Where Observed[2]
Masked Shrew	(Sorex cinereus)	Trapped in western red cedar forest (DW)	21
Vagrant Shrew	(Sorex vagrans)	Riparian grassland; Douglas fir & western red cedar forest(RG,DW,DN)	21
Mountain Cottontail	(Sylvilagus nuttallii)	Railroad right-of-way (RR)	21
Snowshoe Hare	(Lepus americanus)	Railroad right-of-way (RR)	21
Golden-mantled Squirrel	(Spermophilus lateralis)	Open, Douglas fir/ponderosa pine forest and scree on north side of river (PD,ST)	4
Columbian ground Squirrel	(Spermophilus columbianus)	Banks in open areas along railroad tracks; north of river in open Douglas fir-ninebark forest (RR,RG,DN)	3,4,20,21,22
Red-tailed Chipmunk	(Eutamias ruficaudus)	Railroad right-of-way; talus (RR,ST,PD)	21,22,19
Yellow-pine Chipmunk	(Eutamias oreonus)	Railroad right-of-way; talus (RR,ST,PD)	21,22,19
Red Squirrel	(Tamiasciurus hudsonicus)	Conifers; several middens in Section 21 (DW,DS,DN)	3,4,5,6,20,21,22, 23,24
Northern Flying Squirrel	(Glaucomys sabrinus)	Remains discovered in conifers (DW); Trapped in riparian forest (CC)	22
Beaver	(Castor canadensis)	Undercut banks along south shore of river falls and observed in calm water below the falls (WI,SW)	M,N,E,I
Northern Pocket Gopher	(Thomomys talpoides)	Riparian grassland (RG)	
Deer Mouse	(Peromyscus maniculatus)	Coniferous forest, talus (DW,DS,ST,DN) & riparian grassland (RG)	21
Red-backed Vole	(Clethrionomys gapperi)	Western red cedar forest (DW), riparian grassland (RG)	21

Table 4. (continued)

Common Name	Scientific Name	General Habitat Description[1]	Where Observed[2]
Meadow Vole	(Microtus pennsylvenicus)	Riparian grassland (RG)	21
Long-tailed Vole	(Microtus longicaudus)	Riparian grassland and shrubbery (RG,RC)	21
Muskrat	(Ondotra zibethica)	Below the falls in calm water (SW) Above the falls in calm water, on rocks alongside of Canyon(RG)	E
Meadow Jumping Mouse	(Zapus princeps)	Riparian grassland (RG)	21
Bushy-tailed Woodrat	(Neotoma cinerea)	Steep sidehill, large rocks in timber, railroad right-of-way (RO,RR)	22
Mink	(Mustela vison)	Remains discovered on highway 2	21
River Otter	(Lutra canadensis)	Dense, deciduous bank vegetation and river (SW,AV,ER)	M N
Coyote	(Canis latrans)	Conifer forests, deciduous vegetation, meadows, shore (DW,RG,GB)	21
Black Bear	(Ursus americanus)	Trail through dense vegetation leading to river; apparently regularly used, *Orchard in Sheppard Meadows (OR)*	18
White-tailed Deer	(Odocoileus virginianus)	Often associated with water and dense brush but also observed in rocky habitats, railroad right-of-way (PD,DS,RR,DW), *gravel bar (GB)*	5,6,9,13,0
Mule Deer	(Odocoileus hemionus)	Often observed on steep timbered hillsides but also occurring on the flood plain (PD,DN)	5,10,12,21
Elk	(Cervus canadensis)	One set of tracks in cedar forest (DW)	21
Moose	(Alces alces)	River floodplain and cedar forest (RC,DW)	17,19
Bighorn Sheep	(Ovis canadensis)	Primarily in Douglas-fir habitat types and associated bluffs, broken terrain, cliffs and parks north of the river (RO,DN,DS,RG,PD,ST)	1,2,3,4,5,6,7,8, 9,10,11,12,13

[1] Habitat category abbreviations as in appendix A.

[2] See appendix B for location codes of river (letters) and upland (numbers) portions of the study area.

Italics indicate new observations.

Project Area Wildlife Census

Results of the wildlife censuses conducted in the project area during the study period are summarized in table 5.

Table 5. Results of project area wildlife censuses, September 1981–August 1982.

Species	Average number known present per trip			
	Jan.	Mar.–Apr.	June	Aug.
BIRDS				
Great Blue Heron	–	0.3	0.3	–
Canada Goose	4.3	6.7	–	0.7
Mallard	0.3	29.0	10.7	18.3
Common Goldeneye	21.0	23.3	0.3	–
Harlequin Duck	–	–	0.7	0.7
Common Merganser	3.7	7.3	32.7	15.0
Unidentified Duck	–	–	0.3	–
Red-tailed Hawk	–	–	–	0.3
Bald Eagle	0.7	0.3	–	–
Osprey	–	–	2.3	2.0
American Kestrel	–	–	0.3	–
Killdeer	–	–	1.3	–
Spotted Sandpiper	–	–	3.3	1.3
California Gull	–	–	–	0.7
Unidentified Gull	–	–	–	3.7
Mourning Dove	–	–	1.0	4.0
Belted Kingfisher	–	–	–	0.7
Common Flicker	–	–	–	0.7
Pileated Woodpecker	–	0.3	–	–
Downy Woodpecker	0.3	–	–	–
Willow Flycatcher	–	–	1.0	–
Empidonax Flycatcher	–	–	1.3	0.7
Violet-green Swallow	–	5.0	19.3	2.0
Barn Swallow	–	–	0.3	2.3
Stellar's Jay	–	0.3	–	–
Common Raven	1.3	1.3	–	0.3
Common Crow	1.3	13.7	16.0	14.7
Black-capped Chickadee	–	3.0	1.3	1.7
Boreal Chickadee	–	0.7	–	–
Chestnut-backed Chickadee	–	0.7	–	–
Unidentified Chickadee	–	2.0	–	–
Dipper	4.3	4.7	4.7	1.7
Gray Catbird	–	–	1.7	–
American Robin	–	11.7	11.0	1.7
Varied Thrush	–	9.3	0.3	–

Table 5. (continued)

Species	Average number known present per trip			
	Jan.	Mar.-Apr.	June	Aug.
Swainson's Thrush	-	0.3	5.7	-
Veery	-	-	-	1.0
Mountain Bluebird	-	0.3	-	-
Townsend's Solitaire	-	0.3	-	0.7
Cedar Waxwing	-	-	1.3	1.7
Red-eyed Vireo	-	-	2.3	-
Yellow Warbler	-	-	5.7	0.7
Yellow-rumped Warbler	-	-	6.0	2.0
MacGillivray's Warbler	-	-	1.7	-
American Redstart	-	-	1.7	-
Unidentified Warbler	-	-	1.3	-
Brown-headed Cowbird	-	-	1.3	-
Pine Grosbeak	-	-	-	2.7
Pine Siskin	-	-	-	0.3
Dark-eyed Junco	-	46.3	9.0	6.7
Song Sparrow	-	15.3	12.7	5.0
Unidentified Sparrow	-	0.3	-	-
Unidentified Passerine	0.7	5.0	0.7	16.0
MAMMALS				
Unidentified Chipmunk	-	-	2.3	4.3
Tree Squirrel	1.7	-	2.0	5.7
Bighorn Sheep	-	2.0	-	2.7
Unidentified small mammal	-	-	-	0.3
White-tailed Deer	-	-	1.0	-

Seasonal variation in numbers of species encountered during project area censuses each month is shown in figure 1. Study data show that the number of water-related bir species (waterfowl, shorebirds, herons, gulls, ospreys, bald eagles, dippers, belted kingfishers) remains relatively constant year round, with a slight increase during the breeding season. The number of species of other birds, although relatively high throughout the year, increases considerably during the breeding season.

Census results for the dipper are shown in figure 2, and variations in average monthly abundance of the most common waterfowl species, as determined by the censuses, are portrayed in figure 3.

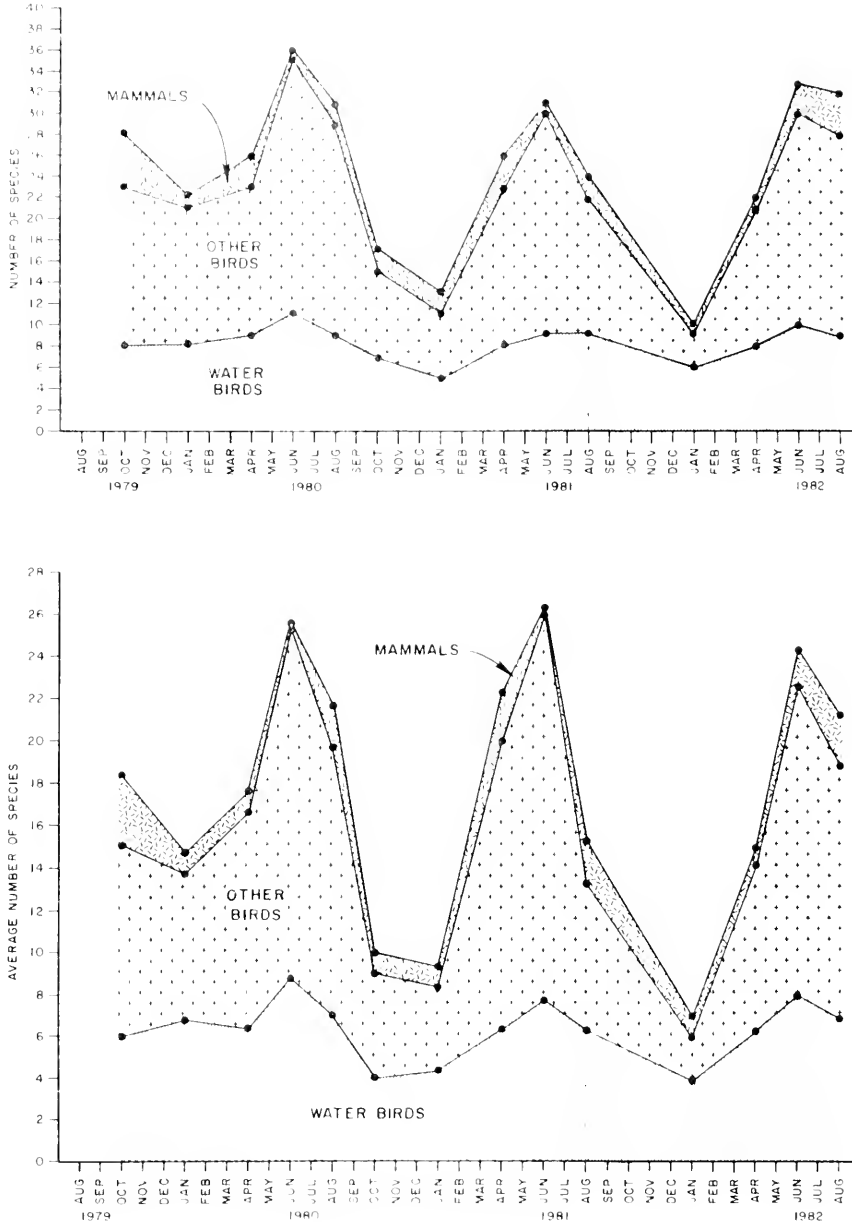


Figure 1. Seasonal variation in total (top) and average (bottom) numbers of species encountered during project area censuses.

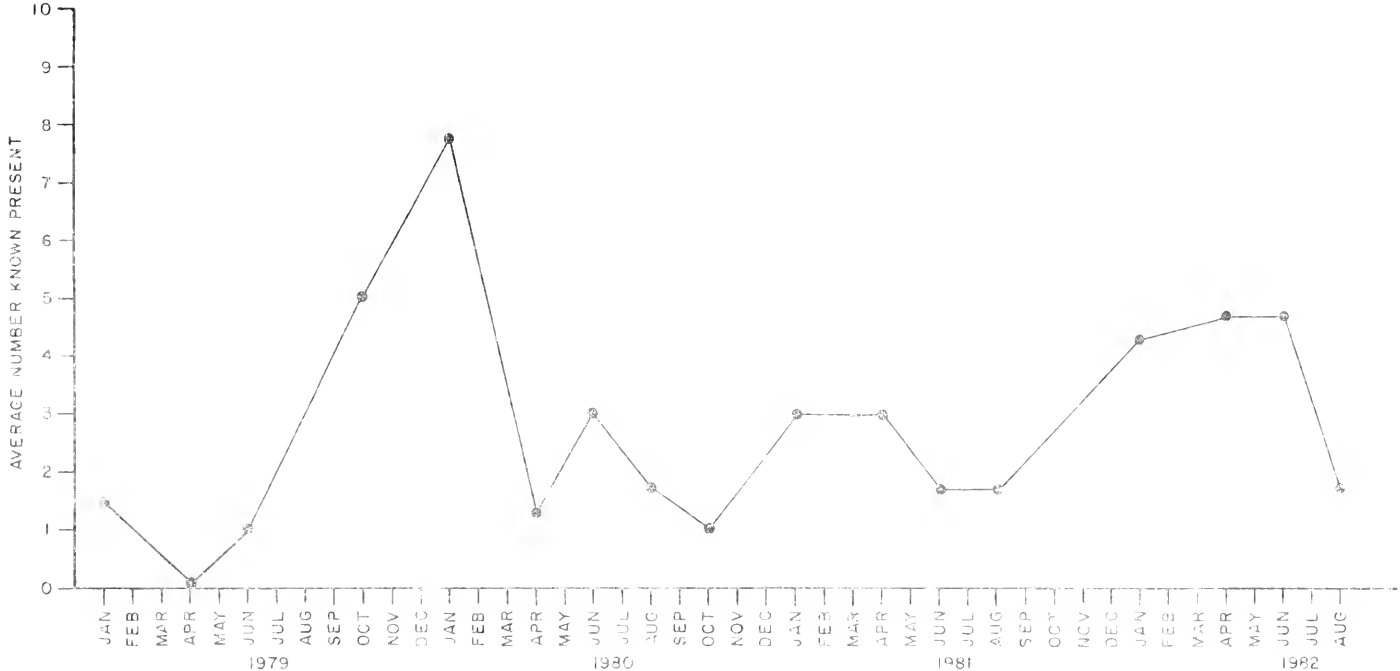


Figure 3. Seasonal variation in average numbers of dippers encountered during project area wildlife censuses.

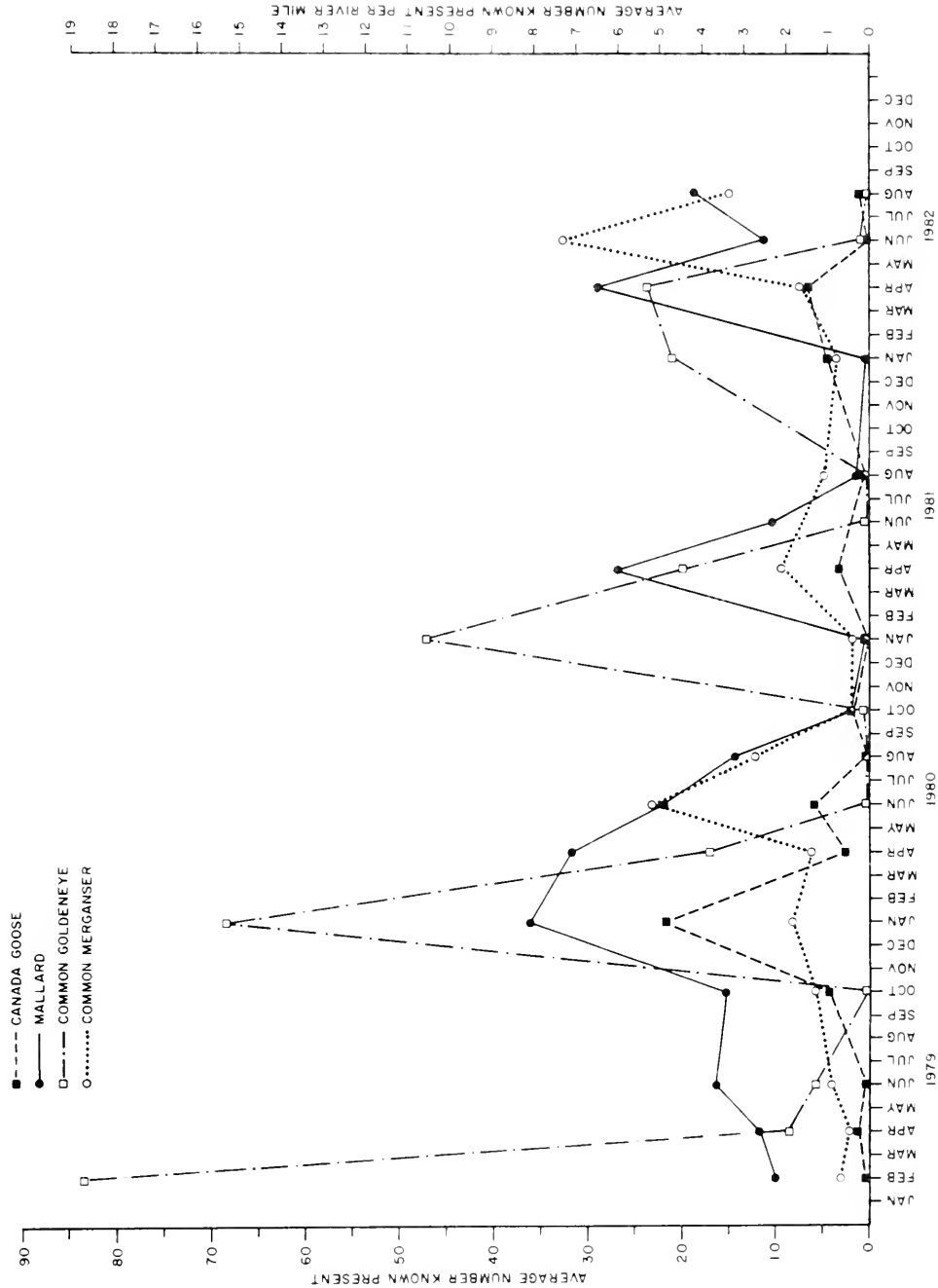


Figure 3. Seasonal variation in average number of Canada goose, mallard, common goldeneye, and common mergansers encountered during project area wildlife censuses.

Bald Eagle Survey

During the monitoring study, bald eagles were observed in January and March 1982 (table 6).

Table 6. Bald eagle observations made during the monitoring study in the Kootenai Falls area, September 1981-September 1982.

Date	Observer[1]	Location (River Section)[2]	Minimum Number Known Present
January 6	PN	N	1 adult[3]
January 7	PN	L,N,T	3 (2 adults, 1 sub-adult)
January 8	PN	P	2 adults
March 4	PN	P	1 adult
March 5	PN	R	1 adult
March 30	PN	N	1 adult

1 PN=Pat Nichols
2 Location codes as in appendix B
3 Observation made during bald eagle surveys

Harlequin Duck Special Studies

Information on harlequin ducks observed during the monitoring period is presented in table 7. Harlequin ducks were observed in November 1981, and May, June, July, and August 1982. An active nest was discovered in a logjam at the head of the falls and observations of at least two young were made (Wolfe 1982). During August 1982, DNRC searches for broods were unsuccessful.

Table 7. Harlequin duck observations in the Kootenai Falls area, September 1981-August 1982.

Date	Minimum number known present				Location (River Section)[1]
	Males	Females	Pairs	Total	
November 29, 1981[2]	-	1	-	1	P
April 17, 1982[5]	1	1	1	2	L
April 24, 1982[5]	1	1	1	2	L
April 26, 1982[5]	2	1	1	3	L
May 7, 1982[3]	1	1	1	2	Q
May 15, 1982[3]	1	1	1	2	S
May 19, 1982[5]	2	1	1	3	L
May 20, 1982[3]	2	2	2	4	P
May 25, 1982[3]	1	1	1	2	M
June 1, 1982[3]	1	1	1	2	S
June 4, 1982[3]	2	1	-	3	J
June 12, 1982[4]	1	1	1	2	L
June 13, 1982[4]	2	1	-	3	L
June 14, 1982[4]	2	1	-	3	L
June 15, 1982[4]	1	-	-	1	M
June 17, 1982[4]	1	-	-	1	L
June 20-30, 1982[5]	1	1	1	4*	L
July 18, 1982[5]	0	1	0	3*	L
August 2, 1982[4]	2	-	-	2	M

1 Abbreviations as defined in appendix B
2 Shot by hunter - John Jeresek
3 Observed by Paul Hamlin
4 Observed by Pat Nichols, DNRC
5 Observed by Carl Wolfe, Kootenai National Forest
* Two downy young observed (Wolfe 1982)

Bighorn Sheep Studies

Locations of bighorn sheep observations recorded during the roadside surveys are shown in figure 4. During censuses of bighorn sheep from U.S. Highway 2 (see table 8), the greatest number of sheep observed on any one census was 51 on April 2, 1982. From early March, the numbers of sheep observed increased through early April. June observations showed lower numbers than in April. A notable census was that of August 5, 1982, when 25 sheep were observed. Prior to 1982, only extremely low numbers of sheep had been observed in the area in August.

On April 2, 1982, a ground search on the Sheppard Meadows was conducted. Eight bighorn rams in two groups were observed on rocks 20 ft. above and 100 ft. to the east of the upstream meadow. Pellet groups (not identified to species) were observed in all meadows; the heaviest concentrations were in the downstream meadow in and around the orchard. Sheep tracks were observed all along the road that runs through the meadow.

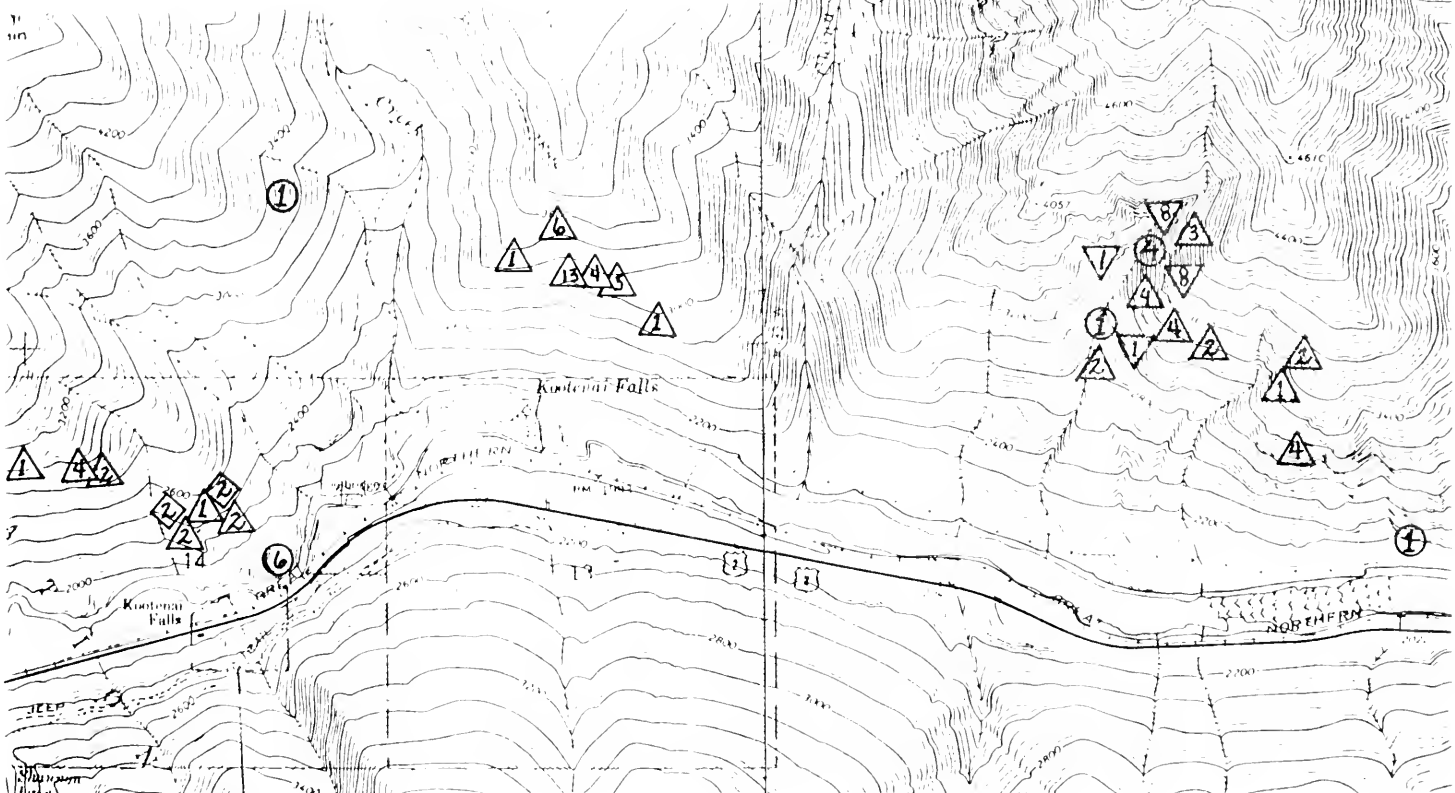
September 1981- September 1982. (Numbers within symbols indicate group size.)

○ = Early March

△ = Late March-Early April

▽ = June

◇ = August



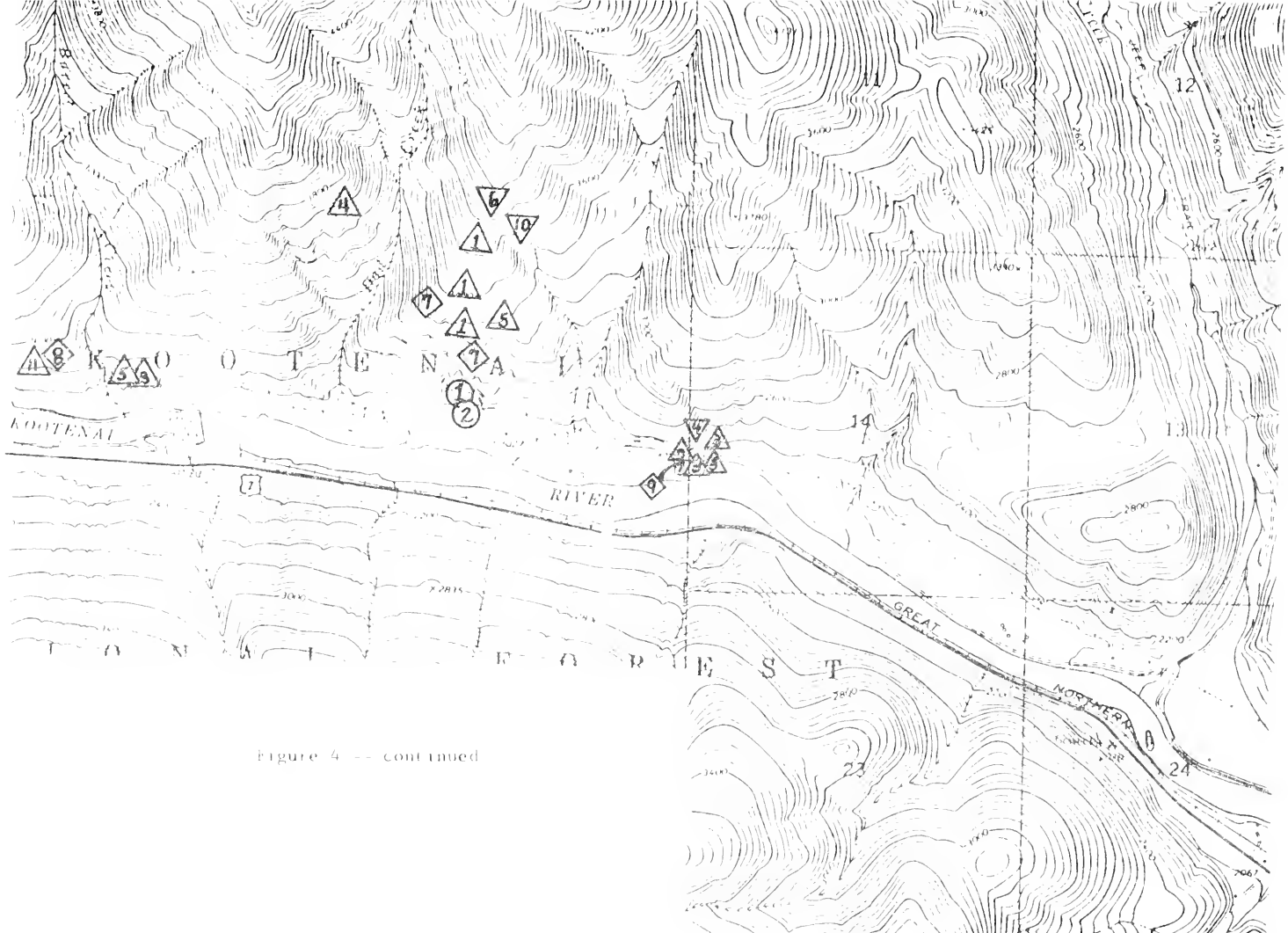


Figure 4 -- continued

Table 8. Results of bighorn sheep roadside surveys, Kootenai Falls study area, 1982.

Date	Observer[1]	Starting Time	Starting Station No.	No. Obs. Recorded[2]	Min. No. Sheep Known Present			
					Rams	Ewes	Other[3]	Total
Jan. 6	PN	0920	1	0	0	0	0	0
Jan. 6	PN	1350	1	0	0	0	0	0
Jan. 8	PN	1530	1	0	0	0	0	0
Jan. Average				0.0	0.0	0.0	0.0	0.0
Mar. 4	PN	0830	1	4	1	0	3	4
Mar. 4	PN	1225	10	4	0	0	4	4
Mar. 4	PN	1526	1	1	0	0	1	1
Mar. 5	PN	0850	10	6	6	0	0	6
Mar. 5	PN	1225	1	1	0	0	1	1
Mar. 5	PN	1550	10	0	0	0	0	0
Early Mar. Average				2.7	1.2	0.0	1.5	2.7
Mar. 29	PN	1645	10	13	3	7	3	13
Mar. 30	PN	1420	10	24	2	9	9	20
Apr. 1	PN	1315	1	20	5	4	4	13
Apr. 2	PN	0624	10	56	2	26	23	51
Apr. 2	PN	1707	1	11	3	1	6	10
Late Mar.-Apr. Average				24.8	3.0	9.4	9.0	21.4
June 12	PN	1909	10	19	4	0	15	19
June 13	PN	0730	1	12	10	0	1	11
June 13	PN	1240	1	8	0	4	4	8
June Average				13.0	4.7	1.3	6.7	12.7
Aug. 2	PN	1313	10	2	0	1	1	2
Aug. 4	PN	1753	1	0	0	0	0	0
Aug. 5	PN	0634	10	25	17	3	5	25
Aug. Average				9.0	5.7	1.3	2.0	9.0

1 PN=Pat Nichols
2 Includes multiple observations of the same individuals
3 Includes lambs and unclassified sheep

Amphibian and Reptile Search

During the 1982 monitoring period, no reptiles or amphibians were observed.

Small Mammal Trapping

Table 9 presents the results of 1982 small mammal trapping.

Table 9. Kootenai Falls small mammal trapping results, August 1982.

	Floodplain Grassland	Riparian Trees and Shrubs	Total
Total number of captures	11	7	18
Total number of species	3	3	5
Total biomass (grams)	255.3	208.9	464.2
Captures per species:			
Masked Shrew (*Sorex cinereus*)	–	1	1
Deer Mouse (*Peromyscus maniculatus*)	8	3	11
Long-tailed Vole (*Microtus longicaudus*)	2	–	2
Meadow Jumping Mouse (*Zapus princeps*)	1	–	1
Flying Squirrel (*Glaucomys sabrinus*)	–	2	2

RECOMMENDATIONS FOR FUTURE MONITORING

The monitoring study should be continued, and work should continue toward selection of a suitable control area on the Kootenai River.

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KOOTENAI FALLS
WILDLIFE
MONITORING STUDY

PLEASE RETURN

Second Annual Report

for the period

September 2, 1980 - September 1, 1981

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December 1981

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INTRODUCTION

Northern Lights, Inc. (NLI), a rural electric cooperative based in Sandpoint, Idaho, submitted an application to the Montana Department of Natural Resources and Conservation (DNRC) in 1980 to build a hydroelectric dam and generating plant, known as the Kootenai River Hydroelectric Project, in the Kootenai Falls area of Lincoln County, Montana. In 1978, NLI contracted with DNRC to conduct a baseline wildlife investigation in the project area. The results of that study, completed in September 1979, were published later that year (DNRC 1979).

To keep the wildlife data base current and to determine the nature of year-to-year variations in wildlife use of the project area, NLI contracted with DNRC in October 1979 to monitor wildlife in the study area (see DNRC 1979 for a study plan). This study would provide a data base for documenting project-related impacts and determining the success of mitigation and compensation programs, should the Board of Natural Resources and Conservation issue a certificate for the project at the Kootenai Falls site.

The first annual report (DNRC 1981) documented results from the first year of the Kootenai Falls wildlife monitoring study (September 2, 1979, through September 1, 1980). The area monitored in that study was the same as the area inventoried during the original baseline study (DNRC 1979, pp. 2-3), although some surveys were also conducted along U.S. Highway 2 between Libby and Troy.

This second annual report highlights results from the second year of the Kootenai Falls wildlife monitoring study (September 1, 1980 through August 31, 1981). The area investigated during this monitoring period was basically the same as that studied during the last monitoring period. Some modifications in monitoring study design, as suggested in the first annual report (DNRC 1981) were employed this year.

METHODS

Field techniques and analytical methods used in this study were as described in the baseline studies report (DNRC 1979, pp. 109-112) and the first monitoring report (DNRC 1981). Three biologists worked in the study area during the study period (see table 1). A brief summary of methods employed for individual study segments follows.

Table 1. Schedule of September 1980 - September 1981 field work, Kootenai Falls wildlife monitoring study.

Dates	Observer(s)(1)	Type of Field Work
October 14-19, 1980	PN	Riparian wildlife census, bighorn sheep count.
January 7-9, 1981	PN	Riparian wildlife census, bald eagle survey, bighorn sheep counts.
April 3-7, 24, 1981	LT, SK	Riparian wildlife census, bighorn sheep tracking, bighorn sheep count, amphibian and reptile search, census of Yaak Falls.
June 2, 12-16, 1981	LT, SK	Riparian wildlife census, harlequin duck survey, bighorn sheep count, amphibian and reptile search.
July 31 & August 2-5, 1981	PN	Riparian wildlife census, harlequin duck survey, bighorn sheep counts, amphibian and reptile search, small mammal trapping.

(1)
PN = Pat Nichols
LT = Larry Thompson
SK = Stacy Kiser

Species List Update

The species lists presented in the baseline report (DNRC 1979) were updated.

Project Area Wildlife Census

This census was designed to collect data that would allow comparing wildlife use of the project area between months and between years. The methods used were patterned after the standard winter bird study (Kolb 1965) and breeding bird census techniques (Hall 1964, Van Velzen 1972) used in the original inventory, but were expanded to include all vertebrate species. The

area censused included: the entire Kootenai River and its shorelines from 50 m (164 ft) below the proposed dam outlet to the upper end of the proposed reservoir; the land that would be inundated by the dam at a forebay elevation of 610m (2,000 ft); the land that would be affected by railroad relocation; and all remaining land between U.S. Highway 2 and the Kootenai River (see Appendix B). The entire area was censused for three consecutive days during each month of October 1980, and January, April, June, and August 1981, following the instructions outlined in the baseline report (DNRC 1979, appendix F).

Bald Eagle Survey

The Kootenai River between Libby and Troy was surveyed for bald eagles on January 7, 8, and 9, 1981 (1 count each day) following the methods of Meyer (1979). Surveys were made from U.S. Highway 2. Bald eagles seen during project area wildlife censuses and other monitoring field work also were recorded.

Harlequin Duck Special Studies

In addition to surveys made during project area wildlife censuses, special searches of the Kootenai Falls area for harlequin ducks were conducted each study day in June and August. In June, emphasis was placed on determining the total harlequin duck population and the number of pairs present in the project area; in August, emphasis was placed on locating broods.

Bighorn Sheep Studies

During the study period, several different methods were used to gather information on bighorn sheep, as described below.

Bighorn sheep were observed from strategic viewpoints along U.S. Highway 2 during each of the five survey field trips (table 1). In October and January, the cliffs north of the Kootenai River between Libby and Troy were surveyed with a spotting scope. Beginning in April, this method was modified to include only the project area and the area within one mile (upstream) of the project area. Researchers also followed a more controlled observation schedule. These changes were suggested in the first annual report (DNRC 1981). During each survey, the north bank of the river was searched for 10 minutes from each of 10 observation points along U.S. Highway 2. Six such surveys were performed in April, three in June, and three in August. Observations of bighorn sheep made during these surveys, as well as those made in conjunction with other field work, were recorded on maps and standard data sheets. Observations of deer were also recorded. In April, the Sheppard Meadows (DNRC 1981) were searched for tracks or other evidence of bighorn sheep use.

Amphibian and Reptile Search

During April, June, and August, at least four hours each month were spent searching likely habitat in the project area for amphibians and reptiles.

Small Mammal Trapping

Two snap-trap lines (each consisting of 25 stations with two traps per station) were run for three consecutive nights (August 2-4, 1981), one in riparian cottonwoods at the head of Kootenai Falls, and the other in adjacent riparian grassland. Capture data were recorded on standard data sheets.

Census of Yaak Falls

The census of Yaak Falls (DNRC 1981) was discontinued because prior observations indicated that the site is unsuitable as a control or compensation area.

WEATHER

Table 2 summarizes weather data collected at the NOAA Libby recording station (Libby 1 NE Ranger Station) for the period September 1980 to July 1981. The data show that the winter of 1980-81 was exceptionally mild. Average monthly temperatures were 2.3 to 9.6 degrees Fahrenheit (averaging 4.9 degrees) above normal from November through March, and precipitation averaged 1 inch below normal. Snowfall, which totalled only 21.5 inches over the winter, occurred only during the period November through February. Although data on average snowfall at this recording station are not available, snowfall during the same period the previous year, November 1979 through February 1980, totalled 39.6 inches. Snow depths in 1980-81 were relatively low; the greatest depth, 10 inches, was recorded in December 1980. During the winter of 1979-80, the maximum snow depth of 13 inches occurred in January.

Table 2. Summary of weather parameters at Libby, September 1980-July 1981.

Month	Temperature(1) (degrees Fahrenheit)	Precipitation(1) (inches)	Snowfall (inches)	Maximum Snow Depth on Ground (inches)
September 1980	56.9(+0.1)	1.9(+0.6)	0	0
October 1980	45.7(+0.2)	0.7(-1.3)	0	0
November 1980	35.5(+2.3)	1.9(-0.5)	1.5	1
December 1980	30.3(+4.6)	4.1(+1.8)	15.9	10
January 1981	32.0(+9.6)	1.0(-1.4)	0.8	1
February 1981	33.1(+3.0)	1.7(+0.1)	3.3	3
March 1981	40.9(+5.2)	0.3(-1.0)	0	0
April 1981	46.3(+1.0)	1.7(+0.6)	0	0
May 1981	54.4(+0.4)	3.5(+1.9)	0	0
June 1981	56.6(-3.7)	3.4(+1.5)	0	0
July 1981	65.5(-1.5)	1.2(+0.5)	0	0

(1) Monthly average (departure from normal)

RESULTS AND DISCUSSION

Species List Update

During this monitoring period, 56 species of vertebrates were observed or trapped--45 birds, 10 mammals, and one amphibian. These included 2 new species--the canyon wren and veery. These new species bring the total number of species observed since the studies began in 1978 to 116 (1 amphibian, 1 reptile, 86 birds, and 28 mammals). Data on these species are summarized in tables 3 and 4.

Project Area Wildlife Census

Results of the wildlife censuses conducted in the project area during the study period are summarized in table 5.

Table 3. Summary of data collected on amphibian, reptile, and bird species observed on the Kootenai Falls study area, January through August, 1981

Species	Habitat[1]	Where Observed[2]	Status and Abundance[3] This Study	Skaar[4] (1980)	J A N	F E B	M A R	A P R	M A Y	J U N	J U L	A U G	S E P	O C T	N O V	D E C
AMPHIBIANS																
Coeur D'Alene Salamander *Plethodon vandykei*	RO	22	NA	NA	-	-	-	-	-	-	-	A	-	-	-	-
REPTILES																
Garter Snake *Thamnophis* spp.	GB	P, 20	NA	NA	-	-	-	-	-	J	-	-	-	-	-	-
BIROS																
Great Blue Heron *Ardea herodias*	GB,SW,ER	C,D,F,J,H,L,M,N,O P,Q	s-U	Bw	J	-	-	-	M	J	J	A	-	O	-	-
Canada Goose *Branta canadensis*	SW,GB,RG	C,D,E,M,N,	B-C w-C	w	J	F	M	A	M	J	-	A	-	-	-	-
Mallard *Anas platyrhynchos*	SW,FW,GB,FA,ER,AV,CM	D,F,H,L,M,N,O,P,Q,R, S,T	W-A,B-A	BW	J	F	M	A	M	J	J	-	S	-	N	-
Gadwall *Anas strepera*	GB,SW	O	fm-U	b	-	-	-	-	-	-	-	-	-	O	-	-
Green-winged Teal *Anas crecca*	GB,SW	O	sm-U	Bw	-	-	-	A	-	-	-	-	-	-	-	-
Blue-winged Teal *Anas discors*	GB,SW	M,O	s-R	B	-	-	-	-	-	J	-	-	-	-	-	-
American Wigeon *Anas americana*	SW,GB	M	sm-R	B	-	-	-	A	M	-	-	-	-	-	-	-
Common Goldeneye *Bucephala clangula*	SW,ER,FW,GB,FA	E,F,H,M,N,O,P,Q,R,S, T	W-A,b-A	BW	J	F	M	A	M	J	-	-	-	-	-	-
Barrow's Goldeneye *Bucephala islandica*	SW,ER	M	b-U	BW	-	-	-	A	M	-	-	-	-	-	-	-
Bufflehead *Bucephala albeola*	SW,AV	M	s-R	Bw	-	-	-	-	-	-	-	A	-	-	-	-
Harlequin Duck *Histrionicus histrionicus*	FA,FW,ER,BR,SW	F,G,H,J,L,M,N	B-J	b	-	-	-	A	M	J	J	A	-	O	-	-
Hooded Merganser *Lophodytes cucullatus*	SW	N,O,P	w-R	Bw	J	-	-	-	-	-	-	-	-	-	-	-

Table 3. (continued)

Species	Habitat[1]	Where Observed[2]	Status and Abundance[3] This Study	Skaar[4] (1980)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Common Merganser *Mergus merganser*	FW,GB,SW,AV,ER	D,F,G,H,M,N,O,P,Q,R,S	W-U,B-A	Bw	J	F	M	A	M	J	J	-	S	O	N	-
Red-tailed Hawk *Buteo jamaicensis*	PD,OA	2,4,8	w-R,S-U	B	-	F	-	-	-	J	-	-	-	O	-	-
Golden Eagle *Aquila chrysaetos*	PD	6,20	s-R	BW	-	-	-	A	-	-	-	-	-	-	-	-
Bald Eagle *Haliaeetus leucocephalus*	SD,RC,DS,SC,CC,PD,OA	B,D,E,F,H,M,V 8,9,13,21	W-U,s-U	bW	J	F	M	-	-	J	J	-	-	O	N	-
Osprey *Pandion haliaetus*	OA,SW,FW,SD,CC	D,E,M,N,O,P,Q 7,19,20,21,22,24	b-C	B	-	-	M	A	M	J	J	A	S	-	-	-
Merlin *Falco columbarius*	RO,DS	22	w-u,b-U	bw	J	-	-	-	-	J	-	-	-	-	-	-
American Kestrel *Falco sparverius*	SC,RD,CC,DS,SD	21,22	B-U	Bw	-	-	-	-	M	J	J	-	-	-	-	-
Ruffed Grouse *Bonasa umbellus*	DW,DS	8,18,21,22,23	b-U,w-U	BW	-	F	-	A	M	J	-	-	-	O	-	-
Killdeer *Charadrius vociferus*	GB	D,P,25	B-U	BW	J	-	-	A	M	-	-	-	-	-	-	-
Spotted Sandpiper *Actitus macularia*	GB,ER,FA	F,J,K,L,M,N,O	b-C	B	-	-	-	-	M	J	J	-	-	-	-	-
California Gull *Larus californicus*	SW,OA	M	s-U	-	-	-	-	-	-	J	J	-	-	-	-	-
Ring-billed Gull *Larus delawarensis*	SW,OA,ER	I,L	t-U,fm-R	tw	-	-	-	-	-	-	J	-	-	O	-	-

Table 3. (continued)

Species	Habitat[1]	Where Observed[2]	Status and Abundance[3] This Study	Skaar[4] (1980)	J A N	F E B	M A R	A P R	M A Y	J U N	J U L	A U G	S E P	O C T	N O V	D E C
Mourning Dove *Zenaida macroura*	RR,DS	21,20	w-R,b-U	bw	-	F	-	-	M	J	-	-	-	-	-	-
Common Nighthawk *Chordeiles minor*	FA	L	s-U	B	-	-	-	-	-	-	J	A	-	-	-	-
Black Swift *Cypseloides niger*	OA	L	s-R	b	-	-	-	-	-	-	J	A	-	-	-	-
Vaux's Swift *Chaetura vauxi*	OA	L,M	sm-U	b	-	-	-	-	M	-	-	-	-	-	-	-
White-throated Swift *Aeronautes saxatilis*	OA	M	s-R	b	-	-	-	-	-	-	-	A	-	-	-	-
Calliope Hummingbird *Stellula calliope*	PR,RR,RO,DS	22	s-r	B	-	-	-	-	-	-	J	-	-	-	-	-
Rufous Hummingbird *Selasphorus rufus*	DS	21	s-U	B	-	-	-	-	M	J	J	-	-	-	-	-
Belted Kingfisher *Megaceryle alcyon*	SW	D,N	w-R,s-U	BW	-	F	-	-	M	-	J	-	-	-	-	-
Common Flicker *Colaptes auritus*	RC,CC,SD,DW,DN	21	B-U	BW	-	-	-	A	M	J	J	-	-	O	-	-
Pileated Woodpecker *Dryocopus pileatus*	DW	18,22	W-R,s-R	bW	J	-	-	A	-	J	-	-	-	-	-	-
Hairy Woodpecker *Picoides villosus*	DW,RC,CC,SD	18,21	W-R,s-R	BW	J	-	-	-	M	-	-	-	-	-	-	-
Downy Woodpecker *Picoides pubescens*	RR	21	t-R	b-W	-	-	-	-	-	-	-	-	-	O	-	-
Willow Flycatcher *Empidonax traillii*	Wi,BA	10,21	b-U	b	-	-	-	-	M	J	-	-	-	-	-	-

Table 3. (continued)

Species	Habitat[1]	Where Observed[2]	Status and Abundance[3] This Study	Skaar[4] (1980)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Flycatcher (sp. undeterm.) *Empidonax* sp.	DW,AD,DS,DN	17,19,21,22	b-U		-	-	-	-	M	J	-	-	-	-	-	-
Violet-green Swallow *Tachycineta thalassina*	OA,PR,BR	F,G,H,I,J,K,L,M, 21	b-A	B	-	-	-	A	M	J	J	-	-	-	-	-
Tree Swallow *Iridoprocne bicolor*	OA,SD	L,M,21	B-U	B	-	-	-	-	M	J	J	-	-	-	-	-
Rough-winged Swallow *Stelgidopteryx ruficollis*	OA,BR	F,G	B-U	B	-	-	-	-	M	J	J	-	-	-	-	-
Barn Swallow *Hirundo rustica*	OA,PR	21	b-R	B	-	-	-	-	-	J	-	-	-	-	-	-
Steller's Jay *Cyanocitta stelleria*	DW	22	fm-R	bW	-	-	-	-	-	-	-	-	-	0	-	-
Common Raven *Corvus corax*	DW,PD,RO,DS,DN,OA, RC,CC	M,8,10,26,25,22, 21,20	W-C,B-C	BW	J	-	-	A	M	J	J	-	-	0	-	-
Common Crow *Corvus brachyrhynchos*	DW,PD,DS,DN,OA,ER, RC,CC	L,8,17,18,19,20, 21,22,23,24	W-A,b-A	b	J	F	M	A	M	J	J	A	-	0	-	-
Black capped Chickadee *Parus atricapillus*	DW,DS,CC,BA,SD,DN	19,20,21,22,23,24	W-A,B-A	BW	J	F	M	A	M	J	J	A	-	0	-	-
Mountain Chickadee *Parus gambeli*	DW	22	fm-R	BW	-	-	-	-	-	-	-	-	-	0	-	-
Chestnut-backed Chickadee *Parus rufescens*	DS	21	w-U	bW	J	-	-	-	-	-	-	-	-	-	-	-
Red-breasted Nuthatch *Sitta canadensis*	DW,DS	22	w-R,s-R	BW	-	-	M	-	-	J	-	-	-	0	-	-
Brown Creeper *Certhia familiaris*	DW	22	w-R	BW	-	F	-	-	-	-	-	-	-	-	-	-

Table 3. (continued)

Species	Habitat[1]	Where Observed[2]	Status and Abundance[3] This Study	Skaar[4] (1980)	J A N	F E B	M A R	A P R	M A Y	J U N	J U L	A U G	S E P	O C T	N O V	D E C
Dipper Cinclus mexicanus	RA,FA,ER,GB,FW	F,H,I,J,L,P,Q,21	W-C,b-C	BW	J	F	M	A	M	J	J	A	-	O	N	-
Canyon Wren Catherpes mexicanus	DN	9	b-U	-	-	-	-	-	-	J	-	-	-	-	-	-
Winter Wren Troglodytes troglodytes	DW	22	s-R	BW	-	-	-	-	M	J	-	-	-	-	-	-
Gray Catbird Dumetella carolinensis	BA,AD	19,21	b-U	B	-	-	-	-	-	J	-	-	-	-	-	-
American Robin Turdus migratorius	DW,DS,CC,RC,PD,DN, BA,BR,OA	I,N,5,8,13,20,21,22	b-C	BW	-	-	M	A	M	J	J	A	-	-	-	-
Varied Thrush Ixoreus naevius	DW,DN	8,20,21,22	b-c	Bw	-	-	M	A	M	-	-	-	-	-	-	-
Swainson's Thrush Catharus ustulatus	DS,DW,DN	3,4,13,20,21,22	B-C	B	-	-	-	-	M	J	J	-	-	-	-	-
Veery Catharus fuscescens		21	b-R	b	-	-	-	-	-	-	-	A	-	-	-	-
Mountain Bluebird Sialia currucoides	RO,BR	22,J	t-U	B	-	-	-	A	-	J	-	-	-	O	-	-
Townsend's Solitaire Myadestes townsendi	PD,RO	4,21	w-U,s-U	BW	-	-	M	-	-	J	-	-	-	O	-	-
Golden-crowned Kinglet Regulus satrapa	DW	3,4,17,18,20,21, 22,23,24,25	W-A,b-A	BW	J	F	M	A	M	J	J	-	-	O	-	-
Ruby-crowned Kinglet Regulus calendula	DW,CC	21	b-U	B	-	-	-	-	M	-	-	-	-	-	-	-
Cedar Waxwing Bombycilla cedrorum	DS,PD,BA	20,22	s-U	Bw	-	-	-	-	-	J	J	-	-	-	-	-
Northern Shrike Lanius excubitor	CC	19	w-R	tW	J	-	-	-	-	-	-	-	-	-	-	-

Table 3. (continued)

Species	Habitat[1]	Where Observed[2]	Status and Abundance[3] This Study	Skaar[4] (1980)	J AN	F EB	M AR	A PR	M AY	J UN	J UL	A UG	S EP	O CT	N OV	D EC
Red-eyed Vireo *Vireo olivaceus*	DS,DW,DN,BA	9,20,21	b-U	B	-	-	-	-	-	J	J	-	-	-	-	-
Warbling Vireo *Vireo gilvus*	AD,CC,RR,DW,BA	21,22	b-U	B	-	-	-	-	-	J	J	-	-	-	-	-
Orange-crowned Warbler *Vermivora celata*	BA,CC,PR,OS	22	b-R	b	-	-	-	-	-	-	J	-	-	-	-	-
Nashville Warbler *Vermivora ruficapilla*	BA,CC,DS	20,21,22	b-C	B	-	-	-	-	M	J	-	-	-	-	-	-
Yellow Warbler *Dendroica petechia*	DS,WI,BA,CC	20,21,22,23	b-U	B	-	-	-	A	M	J	-	-	-	-	-	-
Yellow-rumped Warbler *Dendroica coronata*	DW,DS,CC,DN	3,4,5,20,21,22	b-A	B	-	-	-	A	M	J	J	-	-	-	-	-
Townsend's Warbler *Dendroica townsendi*	DW	21,22	b-U	B	-	-	-	-	-	J	J	-	-	-	-	-
MacGillivray's Warbler *Oporornis tolmiei*	DW,RR,BA,CC	18,20,21,22	b-C	B	-	-	-	A	M	J	J	-	-	-	-	-
American Redstart *Setophaga ruticilla*	BA,DW,CC	22	b-U	B	-	-	-	-	-	J	J	-	-	-	-	-
Western Meadowlark *Sturnella neglecta*	RG	21	t-R	BW	-	-	-	-	-	-	-	-	-	O	-	-
Brown-headed Cowbird *Molothrus ater*	PR,ER,DS,CC	L,M,20,21	b-C	B	-	-	-	-	M	J	J	-	-	-	-	-
Western Tanager *Piranga ludoviciana*	DW,DN,DS,PR,CC	20,21,22	b-U	B	-	-	-	-	-	J	J	-	-	-	-	-
Lazuli Bunting *Passerina amoena*	CC,DW,DS	21	s-R	b	-	-	-	-	-	J	-	-	-	-	-	-

Table 3. (continued)

Species	Habitat[1]	Where Observed[2]	Status and Abundance[3] This Study	Skaar[4] (1979)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Pine Siskin *Carduelis pinus*	PD,DW,DN,CC	20,21	B-C	bW	-	-	-	A	M	J	-	-	-	-	-	-
American Goldfinch *Carduelis tristis*	CC,RG,DS,OA	M	s-R	bW	-	-	-	-	-	J	-	-	-	-	-	-
Red Crossbill *Loxia curvirostra*	DS,DW,CC,DN	19	B-C	bW	-	-	-	-	-	J	-	-	S	O	-	-
Rufous-sided Towhee *Pipilo erythrophthalmus*	BA	21	b-U	bW	-	-	-	A	-	-	-	-	-	-	-	-
Dark-eyed Junco *Junco hyemalis*	DW,DN,PD,DS,CC	3,4,19,20,21,22, 23	B-C	BW	-	-	-	-	M	J	J	-	-	-	-	-
Chipping Sparrow *Spizella passerina*	DS,DW,CC,DN	4,19,20,21,22	B-C	B	-	-	-	-	M	J	J	-	-	-	-	-
Lincoln's Sparrow *Melospiza lincolnii*	DW,DS	21,22	s-R	b	-	-	-	-	M	-	J	-	-	-	-	-
Song Sparrow *Melospiza melodia*	RR,RG,DS,PR,WI,BA	10,18,19,20,21,22	W-U,B-A	BW	J	F	M	A	M	J	J	-	-	O	N	-
Snow Bunting *Plectrophenax nivalis*	PR	21	w-U	Wt	J	-	-	-	-	-	-	-	-	-	-	-

Table 3. (continued)

Footnotes:

[1] Habitat categories abbreviations as in Appendix A.

[2] See Appendix B for location codes of river stretches (letters) and upland areas (numbers).

[3] Status: W - Overwinters in area (at least one record each during January and February).
w - Transient in winter.
sm - Spring migrant.
fm - Fall migrant.
B - Breeds on area (nest or dependent young located).
b - Probably breeds on area (territorial males or pairs located).
s - Summers on area in small numbers but no evidence of breeding.
t - Occurs but no evidence of breeding.

Abundance: A - Abundant, found in large numbers in appropriate habitats.
C - Common, found in moderate numbers in appropriate habitats, 15 to 50 registrations.
U - Uncommon, small numbers in appropriate habitats, 2 to 15 registrations.
R - Rare, few sightings, 1 or 2 registrations.

[4] Indicates status of species in latilong No. 1 as reported by Skaar (1980).

[5] Months when seen are indicated by letter abbreviations in sequence, January through December (Note: Very little field work was carried out in August, September, and November; none was carried out in December).

Table 4. Summary of data collected on general habitat use and local distribution of mammals observed on the Kootenai Falls study area, January 1978 - August 1981.

Common Name	Scientific Name	General Habitat Description[1]	Where Observed[2]
Masked Shrew	(Sorex cinereus)	Trapped in western red cedar forest (DW)	21
Vagrant Shrew	(Sorex vagrans)	Riparian grassland; Douglas fir and western red cedar forest (RG,DW,DN)	21
Mountain Cottontail	(Sylvilagus nuttallii)	Railroad right-of-way (RR)	21
Snowshoe hare	(Lepus americanus)	Railroad right-of-way (RR)	21
Golden-mantled squirrel	(Spermophilus lateralis)	Open, Douglas-fir/ponderosa pine forest and scree on north side of river (PD,ST)	4
Columbian ground squirrel	(Spermophilus columbianus)	Banks in open areas along railroad tracks; north of river in open Douglas-fir-ninebark forest (RR,RG,DN)	3,4,20,21,22
Red-tailed chipmunk	(Eutamias ruficaudus)	Railroad right-of-way; talus (RR,ST,PD)	21,22,19
Yellow-pine chipmunk	(Eutamias ameonus)	Railroad right-of-way; talus (RR,ST,PD)	21,22,19
Red squirrel	(Tamiasciurus hudsonicus)	Conifers; several middens in Section 21 (DW,DS,DN)	3,4,5,6,20,21,22,23,24
Northern flying squirrel	(Glaucomys sabrinus)	Remains discovered in conifers (DW)	22
Beaver	(Castor canadensis)	Undercut banks along south shore of river falls and observed in calm water below the falls (WI,SW)	M,N,D,E
Northern pocket gopher	(Thomomys talpoides)	Riparian grassland (RG)	
Deer Mouse	(Peromyscus maniculatus)	Coniferous forest, talus (DW,DS,ST,DN)	21
Red-backed vole	(Clethrionomys gapperi)	Western red cedar forest (DW)	21
Meadow vole	(Microtus pennsylvanicus)	Riparian grassland (RG)	21
Long-tailed vole	(Microtus longicaudus)	Riparian grassland and shrubbery (RG,SC)	21

Table 4 (continued)

Common Name	Scientific Name	General Habitat Description[1]	Where Observed[2]
Muskrat	(Ondatra zibethica)	Below the falls in calm water (SW)	E
Meadow jumping mouse	(Zapus princeps)	Riparian grassland (RG)	21
Bushy-tailed woodrat	(Neotoma cinerea)	Steep sidehill, large rocks in timber, railroad right-of-way (RO,RR)	22
Mink	(Mustela vison)	Remains discovered on highway 2	21
River otter	(Lutra canadensis)	Dense, deciduous bank vegetation and river (SW,AV,ER)	M-N
Coyote	(Canis latrans)	Conifer forests, deciduous vegetation, meadows, shore (DW,RG,GB)	21
Black Bear	(Ursus americanus)	Trail through dense vegetation leading to river; apparently regularly used	18
White-tailed deer	(Odocoileus virginianus)	Often associated with water and dense brush but also observed in rocky habitats, railroad right-of-way (PD,DS,RR,DW)	5,6,9,13,0
Mule deer	(Odocoileus hemionus)	Often observed on steep timbered hillsides but also occurring on the flood plain (PD,DN)	5,10,12,21
Elk	(Cervus canadensis)	One set of tracks in cedar forest (DW)	21
Moose	(Alces alces)	River floodplain and cedar forest (RC,DW)	17,19
Bighorn sheep	(Ovis canadensis)	Primarily in Douglas-fir habitat types and associated bluffs, broken terrain, cliffs and parks north of the river (RO,DN,DS,RG,PD,ST)	1,2,3,4,5,6,7,8,9, 10,11,12,13

1 Habitat category abbreviations as in Appendix A.

2 See Appendix B for location codes of river (letters) and upland (numbers) portions of the study area.

Table 5. Results of project area wildlife censuses, September 1980-August 1981.

Species	Average number known present per trip				
	Oct.	Jan.	Apr.	June	Aug.
BIRDS					
Great Blue Heron	1.0	0.7	-	-	1.3
Canada Goose	1.7	-	3.3	2.0	-
Mallard	1.7	-	27.0	10.3	1.3
Common Goldeneye	0.3	47.3	20.0	-	-
Harlequin Duck	-	-	-	3.7	-
Common Merganser	1.7	1.7	9.3	6.7	5.0
Unidentified Duck	-	0.3	-	-	-
Bald Eagle	0.3	1.7	-	-	-
Osprey	-	-	0.3	1.7	1.0
Killdeer	-	-	1.3	1.0	-
Spotted Sandpiper	-	-	-	12.3	0.7
California Gull	-	-	-	-	2.7
Mourning Dove	-	-	-	1.3	0.3
Black Swift	-	-	-	-	1.3
Unidentified Hummingbird	-	-	-	0.3	-
Belted Kingfisher	-	-	0.3	0.3	1.0
Common Flicker	1.0	-	3.0	1.0	1.0
Downy Woodpecker	0.3	-	-	-	-
Violet-green Swallow	-	-	7.3	N.E.(1	-
Rough-winged Swallow	-	-	-	N.E.(1	-
Common Raven	1.7	0.7	2.0	3.3	0.3
Common Crow	1.0	1.7	14.7	16.3	7.0
Black-capped Chickadee	5.3	2.7	7.3	1.3	1.3
Red-breasted Nuthatch	4.0	0.7	13.0	2.0	0.3
Gray Catbird	-	-	-	-	0.3
Dipper	1.0	3.0	3.0	1.7	1.7
Winter Wren	-	-	0.3	-	-
Canyon Wren	-	-	-	1.0	-
American Robin	-	-	16.3	12.3	-
Varied Thrush	-	-	1.7	2.3	-
Swainson's Thrush	-	-	-	5.3	-
Veery	-	-	-	-	0.3
Townsend's Solitaire	-	-	1.0	0.7	-
Golden-crowned Kinglet	-	0.7	15.7	-	-
Cedar Waxwing	-	-	-	13.7	-
Red-eyed Vireo	-	-	-	0.3	0.3
Unknown Vireo	-	-	-	5.7	-
Yellow Warbler	-	-	-	1.3	0.3
Nashville Warbler	-	-	-	0.3	-
Yellow-rumped Warbler	-	-	-	-	1.0
MacGillivray's Warbler	-	-	-	-	0.3
Unidentified Warbler	-	-	-	-	1.3
Brown-headed Cowbird	-	-	-	2.3	-
Pine Siskin	16.7	3.0	90.2	8.0	3.7
Red Crossbill	-	-	5.7	-	-
Dark-eyed Junco	-	-	5.3	-	-
Song Sparrow	4.0	-	16.7	15.7	2.3
Unidentified Sparrow	-	-	-	-	-

Unidentified Passerine	-	0.3	6.7	25.0	21.7
MAMMALS					
Unidentified Chipmunk	0.3	-	4.7	-	2.3
Tree Squirrel	1.7	0.3	3.0	-	6.3
Bighorn Sheep	-	2.3	-	-	-
Unidentified small mammal	-	-	0.3	0.3	-

1
NE=no estimate made because of large numbers and constant movement

Seasonal variation in numbers of species encountered during project area censuses each month is shown in figure 1. Study data show that the number of water-related bird species (waterfowl, shorebirds, herons, gulls, ospreys, bald eagles, dippers, belted kingfishers) remains relatively constant year-round, with a slight increase during the breeding season. The number of species of other birds is relatively high throughout the year, but increases considerably during the breeding season.

Census results for the dipper are shown in figure 2, and variations in average monthly abundance of the most common waterfowl species, as determined by the censuses, is portrayed in figure 3.

Bald Eagle Survey

During the monitoring study, bald eagles were observed in October 1980, and in January 1981 (table 6). One adult bald eagle was seen during the January 7 bald eagle survey, and two adults were seen during each of the following two surveys (January 8 and 9). This indicates that the degree of use in 1981 was the same as that reported for 1980 (DNRC 1981).

Table 6. Bald eagle observations made during the monitoring study in the Kootenai Falls area, September 1980-September 1981

Date	Observer(1)	Location (River Section)(2)	Minimum Number Known Present
10-17-80	PN	L	1 adult
1-7-81(3)	PN	T	1 adult
1-8-81(3)	PN	Q,T	2 adults
1-9-81(3)	PN	T	2 adults

(1)
PN=Pat Nichols
(2)
Location codes as in Appendix B
(3)
Observations made during bald eagle surveys

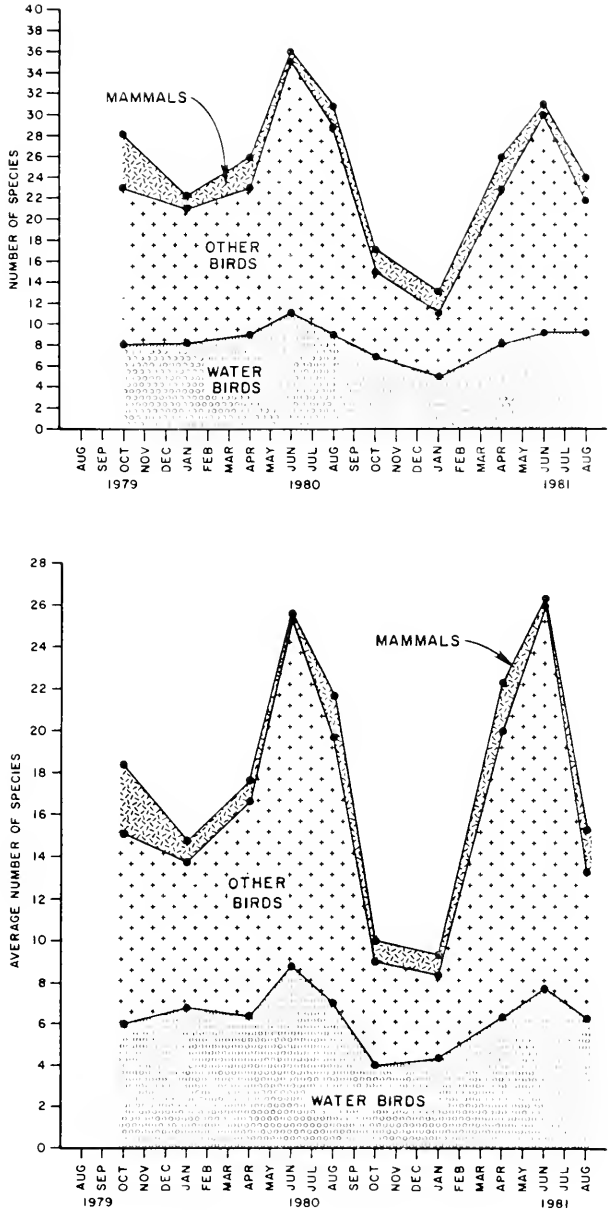


Figure 1. Seasonal variation in total (top) and average (bottom) numbers of species encountered during project area censuses.

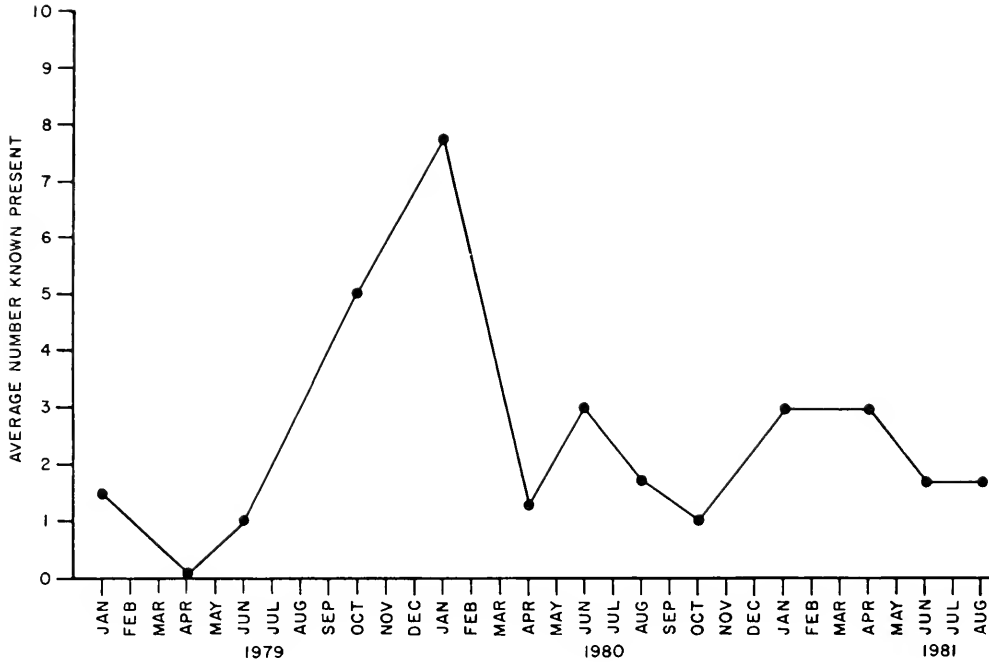


Figure 2. Seasonal variation in average numbers of dippers encountered during project area wildlife censuses.

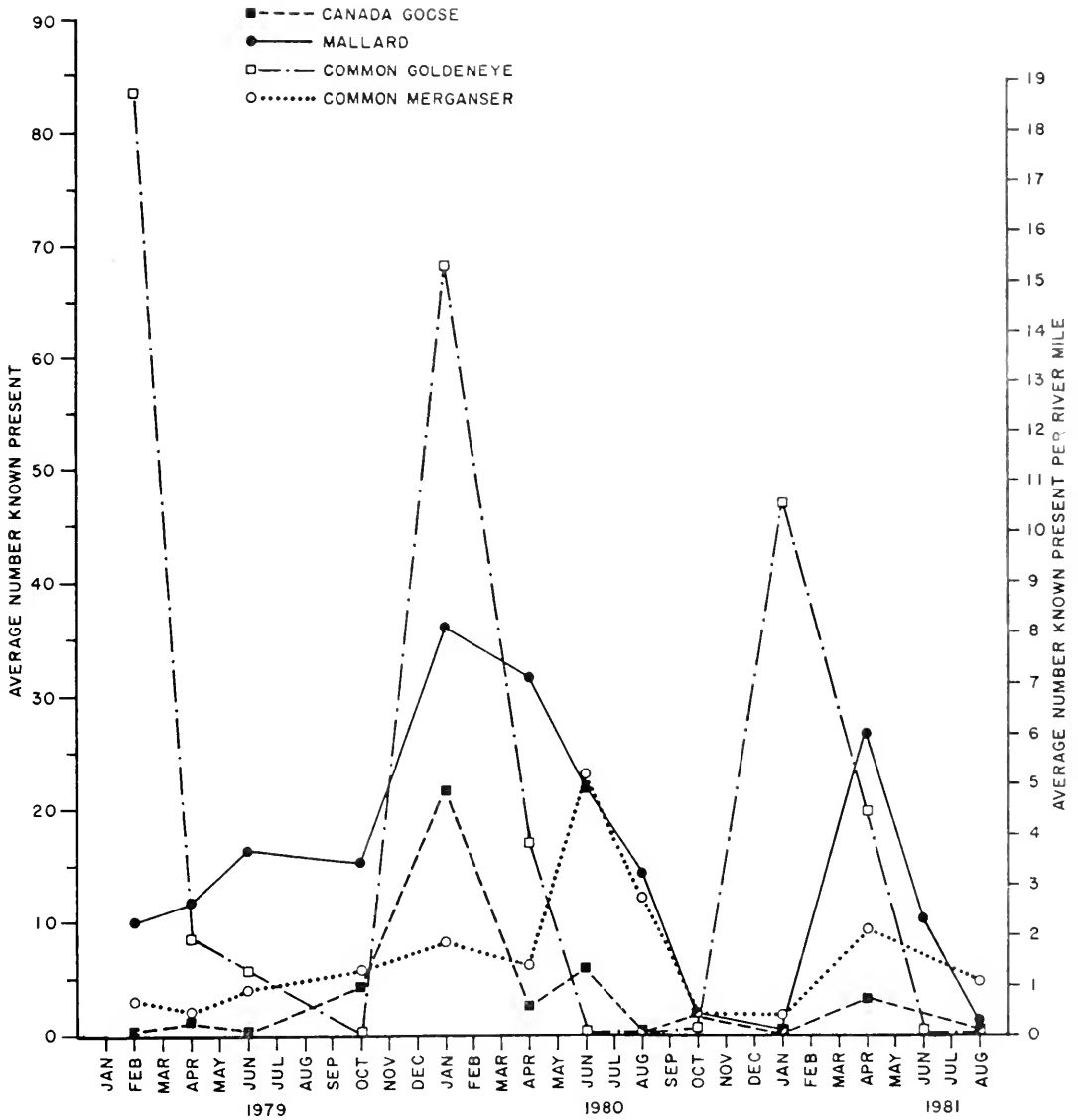


Figure 3. Seasonal variation in average number of Canada goose, mallard, common goldeneye, and common mergansers encountered during project area wildlife censuses.

Harlequin Duck Special Studies

Information on harlequin ducks observed during the monitoring period is presented in table 7. Harlequin ducks were observed only in May and June of 1981. A minimum of 8 ducks (including at least two pairs, 3 possibly unpaired males, and one possibly unpaired female) was known to be present during the study period. During August 1981, searches were made for broods but none were observed. Flows in the river were very high, 20,000 cfs or greater, which might account for the lack of broods in the area. Comparing these data with those obtained in 1980 (DNRC 1981), it appears that use of the falls area by adult harlequins increased considerably in 1981.

Table 7. Harlequin duck observations in the Kootenai Falls area, September 1980-August 1981.

Date	Minimum number known present				Location
	Males	Females	Pairs	Total	(River Section)(1)
May 23, 1981(2)	5	3	1	8	J,L
May 31, 1981(2)	3	3	-	6	L
June 13, 1981(3)	2	2	-	4	L
June 14, 1981(3)	3	2	2	5	L
June 15, 1981(3)	2	2	2	4	L
June 16, 1981(3)	2	2	2	4	L

(1) Abbreviations as defined in Appendix B
(2) Observations by L. Schelvan (USFS)
(3) Observations by S. Kiser

Bighorn Sheep Studies

Locations of bighorn sheep observations recorded during the roadside surveys are shown in figure 4. In October 1980, two groups of sheep were observed on cliffs above the Kilpatrick property. One group consisted of 6 lambs and 7 ewes; the other contained 3 ewes. In January 1981, a group of 6 ewes was observed at the salt lick on the Sheppard property. Table 8 summarizes results of the roadside surveys conducted in April, June, and August, for which different methods than those used for the October and January surveys were employed. In April, at least 40 different sheep were observed. The average number of individual sheep known present during the six April surveys was 26.2; the average number of observations recorded was 35.5. In June, only 6 different sheep were observed, and in August, only 3 were sighted. This decrease in sheep sightings is thought to be due to (1) decreased observability due to leaf-out and use of dense cover by sheep, and (2) summer movement of sheep to somewhat higher elevations, as indicated by other data obtained during the study period. During April visits to the Sheppard meadows, no known bighorn sheep sign was observed.

Table 8. Results of bighorn sheep roadside surveys, Kootenai Falls study area, 1981.

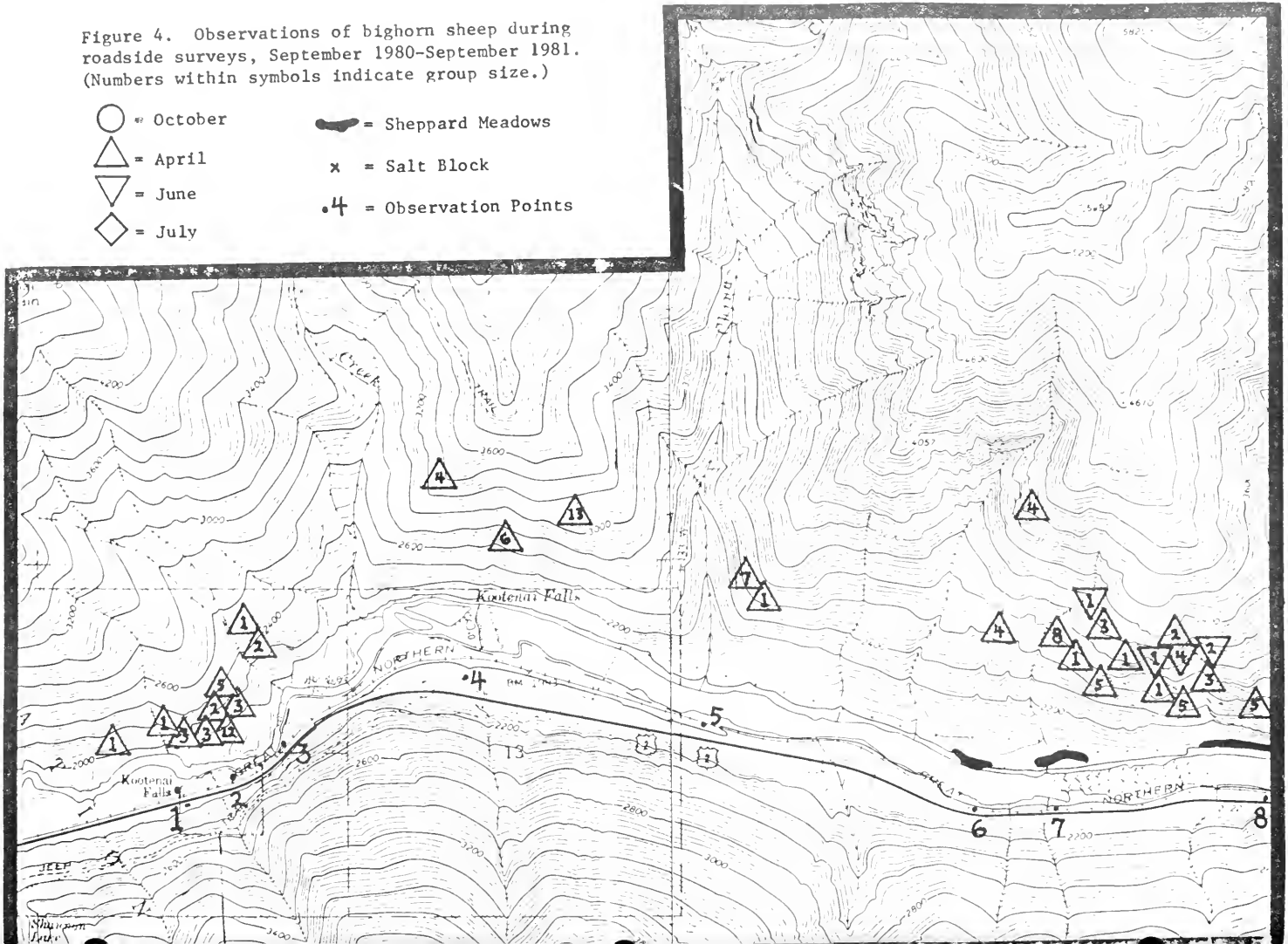
Date	Observer[1]	Starting Time	Starting Station No.	No. Obs. Recorded[2]	Min. No. Sheep Known Present			
					Rams	Ewes	Other[3]	Total
April 4	LT	1702	10	85	18	22	0	40
April 5	LT	1715	1	34	5	17	6	28
April 7	SK	0618	1	18	7	6	4	17
April 7	SK	1155	1	25	6	8	10	24
April 24	SK	0545	10	28	20	7	1	28
April 24	SK	1210	10	23	5	10	5	20
April Average				35.5	10.2	11.7	4.3	26.2
June 12	SK	0545	1	6	1	0	5	6
June 13	SK	1200	1	2	0	1	1	2
June 13	SK	1945	1	4	0	2	2	4
June Average				4.0	0.3	1.0	2.7	4.0
August 2	PN	0750	1	3	0	2	1	3
August 2	PN	1925	10	0	0	0	0	0
August 4	PN	1421	10	0	0	0	0	0
August Average				1.0	0.0	0.7	0.3	1.0

[1]SK=Stacy Kiser, PN=Pat Nichols, LT=Larry Thompson

[2]Includes multiple observations of the same individuals

[3]Includes lambs and unclassified sheep

Figure 4. Observations of bighorn sheep during roadside surveys, September 1980-September 1981. (Numbers within symbols indicate group size.)



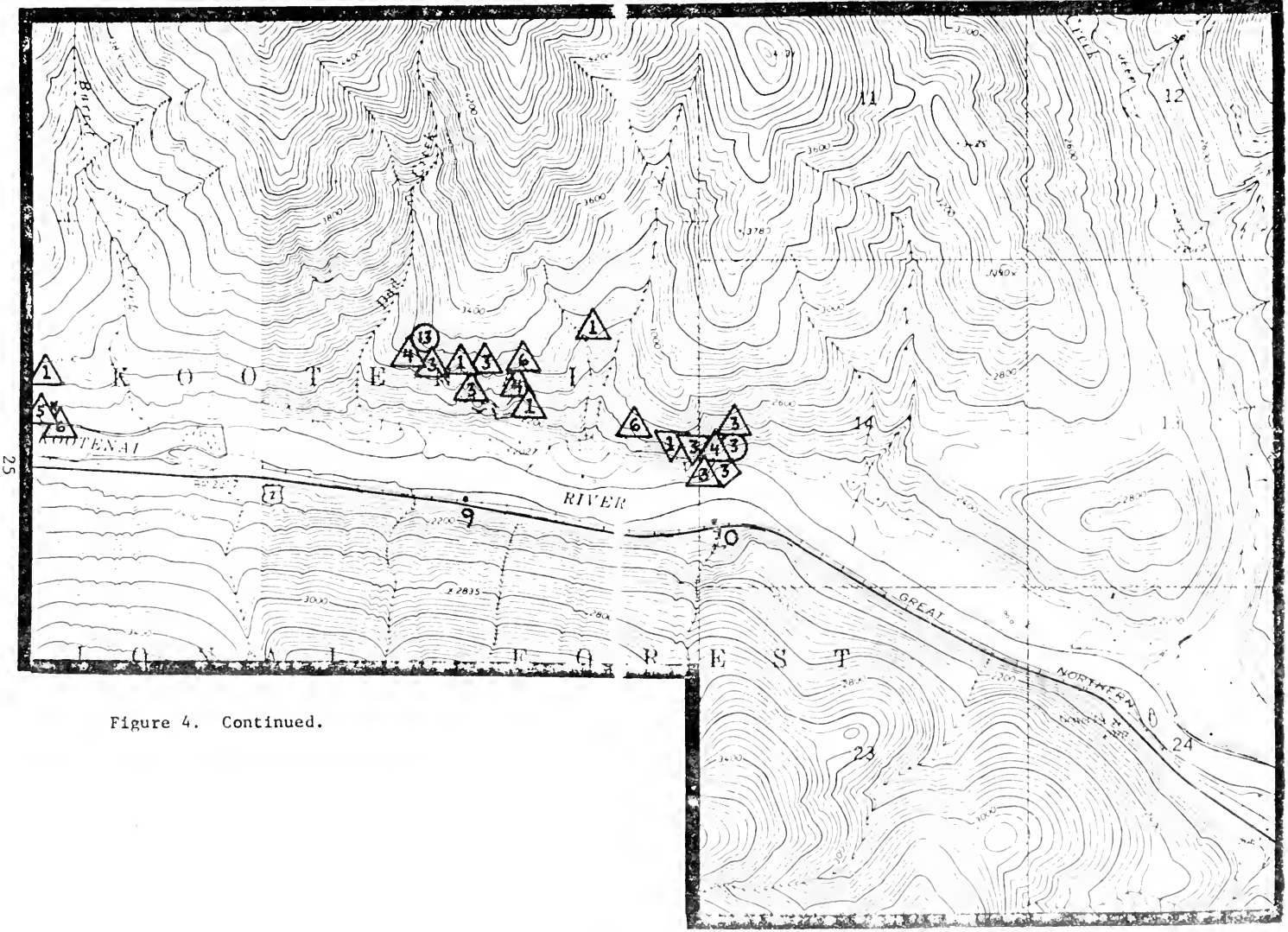


Figure 4. Continued.

Amphibian and Reptile Search

On April 3 and 5, 1981, five different Coeur d'Alene salamanders were observed at two sites in the vicinity of 1980 sightings--under moss on cliffs near the U.S. Highway 2 retaining wall above the proposed tail tunnel outlet. Two specimens, collected in 1980, were deposited with Montana State University in Bozeman.

Small Mammal Trapping

Table 9 presents a summary of the results of 1981 small mammal trapping.

Table 9. Kootenai Falls small mammal trapping results, August 1981.

	Floodplain Grassland	Riparian Trees and Shrubs	Total 1981
Total number of captures	25	15	40
Total number of species	3	4	6
Total biomass (grams)	577	311	888
Captures per species:			
Masked Shrew (*Sorex cinereus*)	--	1	1
Yellow pine Chipmunk (*Eutamias amoenus*)	3	--	3
Deer Mouse (*Peromyscus maniculatus*)	21	12	33
Long-tailed Vole (*Microtus longicaudus*)	1	--	1
Meadow Jumping Mouse (*Zapus princeps*)	--	1	1
Flying Squirrel (*Glaucomys sabrinus*)	--	1	1

RECOMMENDATIONS FOR FUTURE MONITORING

The monitoring study should be continued as modified (DNRC 1981), and work should continue toward selection of a suitable control area. Preliminary study indicates that the section of the Kootenai River below Troy, as well as that part of the river between Libby and the proposed Libby Reregulation Project site, may be the best potential control areas, although they are by no means ideal. During the winter and spring 1982 monitoring studies, an effort should be made to investigate bighorn sheep use of the Sheppard property. This will be especially important if the winter of 1981-82 is more severe than 1980-81. The monitoring contract should be amended to include a late February-early March field trip to further investigate the use of the Sheppard property by bighorn sheep.

ACKNOWLEDGMENTS

This study was funded by Northern Lights, Inc. of Sandpoint, Idaho. Inventory data were gathered by Pat Nichols, Stacy Kiser, and Larry Thompson of the Department of Natural Resources and Conservation. Graphics were executed by June Virag. William Phippen, DNRC, edited the report. Typing was done by Joanne Brown.

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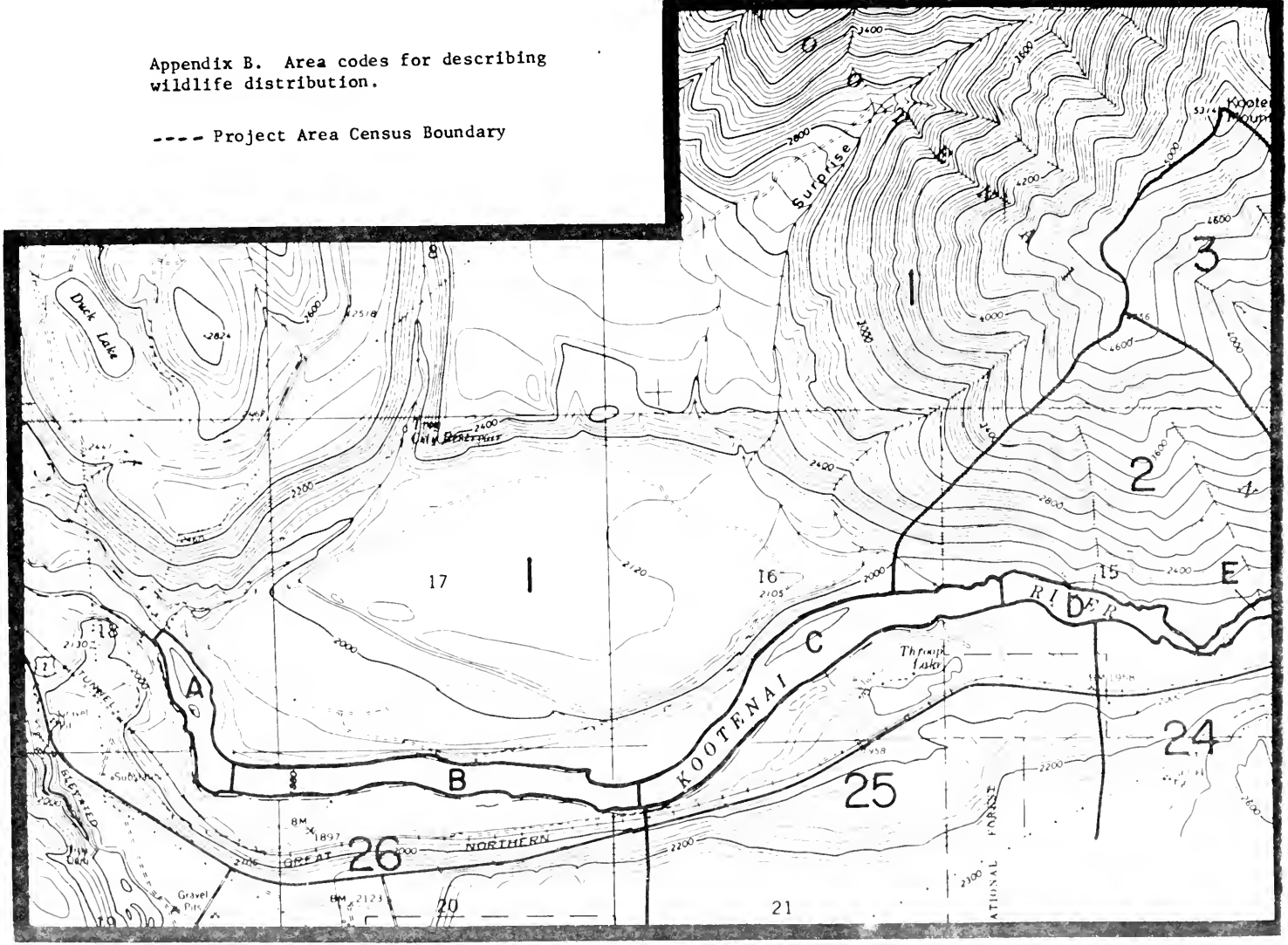
Appendix A. Habitat categories.

Habitat Category	Abbr.	Component Community Types[1]	Dominant Vegetation
WATER HABITATS			
Rapids	RA	-	None--includes fast water broken by shallow rocks
Falls	FA	-	None--includes fast water falling over falls, fast water above and below falls
Slow Water	SW	-	None--includes relatively smooth, wide river sections, mostly unstream of falls, with no white water
Fast Water	FW	-	None--includes narrowly constructed sections of river, mostly below falls having no white water
Aquatic Vegetation (rooted)	AV	17	Ranunculus aquatilus, Elodea canadensis
SPARSELY VEGETATED HABITATS			
Exposed Rock or Logjams (in River)	ER	R	None--includes exposed rock in river surrounded by water as well as logjams
Bare Rock (Upland)	BR	R	None--includes scoured rock along river canyon not surrounded by water
Gravel Bar	GB	12	Tanacetum vulgare, Agrostis alba, Equisetum arvense
Scree and Talus	ST	S	None--includes steep rockslides adjacent to river
Rocky Outcrops (Upland)	RO	15	Festuca scabrella,Physocarpus malvaceus, Philadelphus lewisii
GRASSLAND AND MARSH HABITATS			
Riparian Grassland and Hayfields	RG	14,20,25	Phleum pratense, Poa pratensis, Bromus inermis, Agropyron repens
Fescue Grassland	FG	16	Festuca scabrella, Agropyron spicatum, Balsamorhiza sagittata
Cattail Marsh	CM	13	Typha latifolia
SHRUB HABITATS			
Willow	WI	24	Salix spp., Tanacetum vulgare, Agrostis alba
Birch-Alder-Dogwood	BA	21	Betula occidentalis, Alnus incana, Cornus stolonifera
Alder-Dogwood	AD	11	Alnus incana, Cornus stolonifera
FOREST HABITATS			
Riparian Cottonwoods[2]	RC	10	Populus trichocarpa, Alnus incana, Betula occidentalis
Snags (Deciduous)	SD	10,9,23	Populus trichocarpa (usually)
Cottonwood-Conifers[3]	CC	9,23	Populus trichorcarpa, Pseudotsuga menziesii, Thuja plicata
Ponderosa Pine-Douglas Fir[4]	PD	4,5	Pinus ponderosa, Pseudotsuga menziesii
Douglas Fir/Shrub[3]	DS	6,8	Pseudotsuga menziesii, Pinus ponderosa, Calamagrostis rubescens
Douglas Fir/Ninebark[4]	DN	2,3	Pseudotsuga menziesii, Physocarpus malvaceus
Douglas Fir-Western Red Cedar	DW	1,7	Pseudotsuga menziesii, Thuja plicata
Snags (Coniferous)	SC	1-9,23	Variable
OTHER			
Powerline Right-of-way	PR	18	Betula occidentalis, Ruhus parviflorus, Acer glabrum
Railroad Right-of-way	RR	19	Berberis repens, Rubus parviflorus, Sambucus cerulea
Orchard	OR	22	Pyrus malus
Open Air	OA	-	None--includes open air of river canyon

[1]See DNRC 1979
[2]Early Succession
[3]Mid Succession
[4]Late Succession

Appendix B. Area codes for describing wildlife distribution.

---- Project Area Census Boundary



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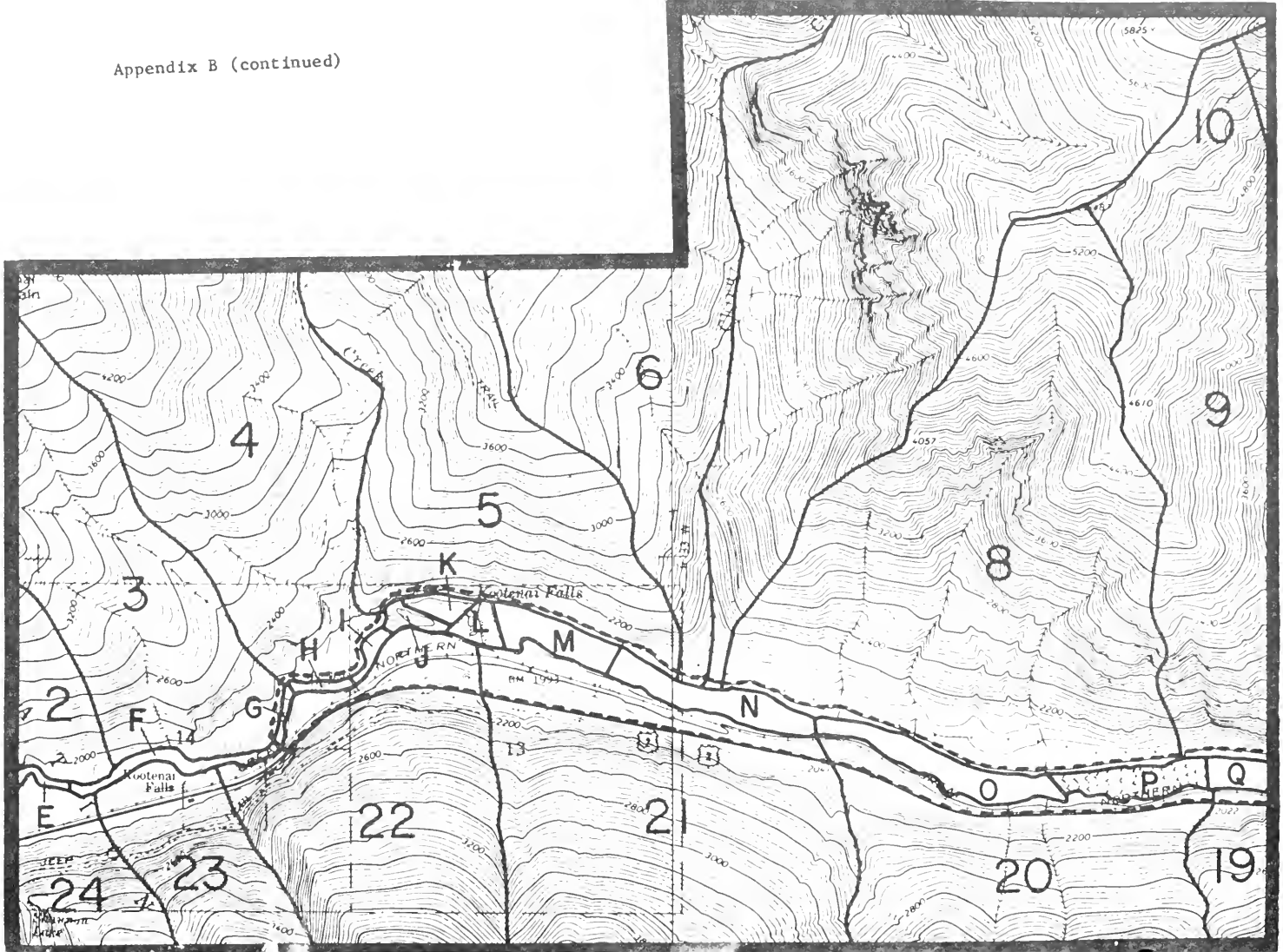

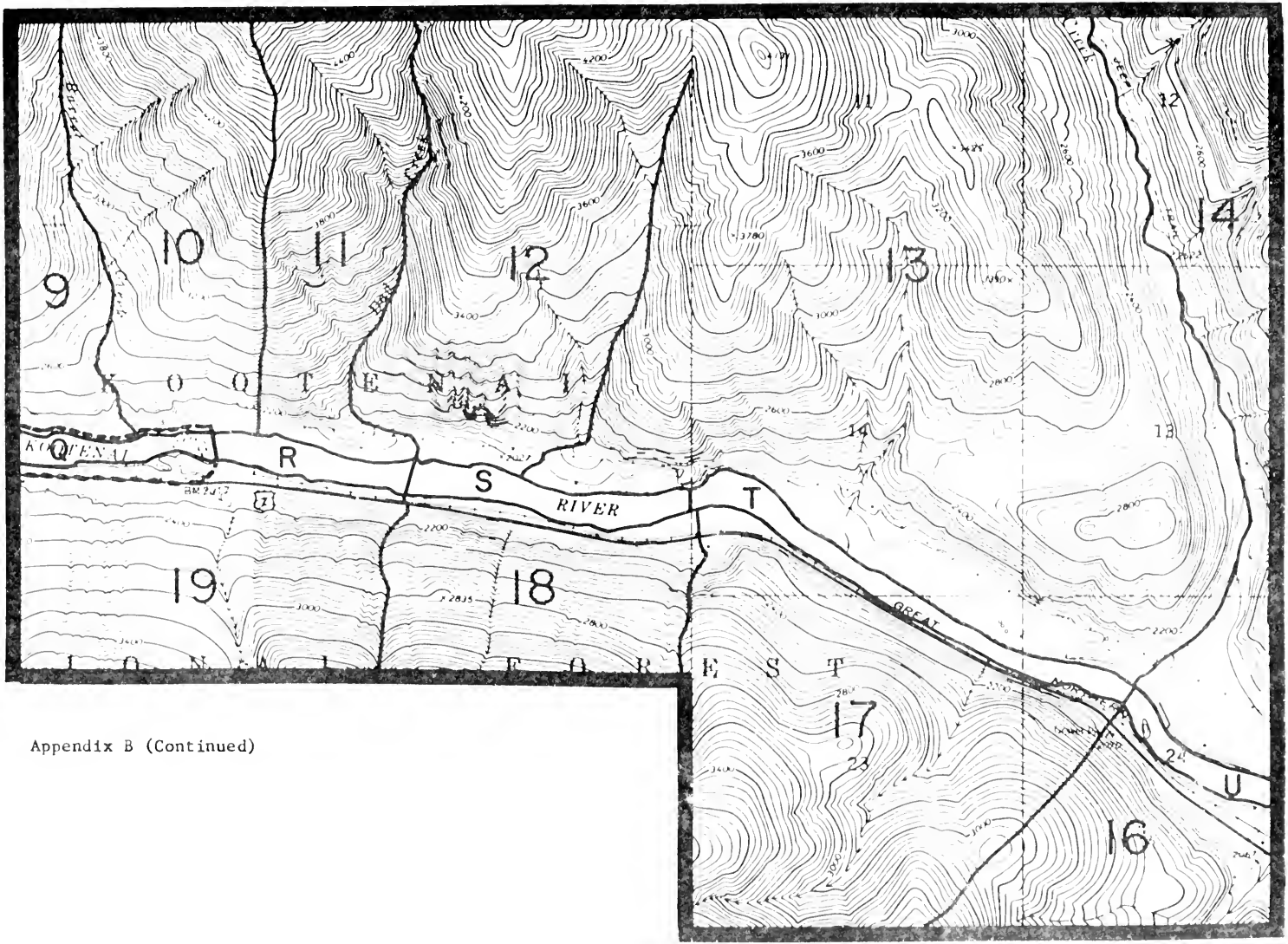

Appendix B (Continued)

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KOOTENAI FALLS

WILDLIFE

MONITORING STUDY

PLEASE RETURN

First Annual Report

for the period

September 2, 1979 - September 1, 1980

MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

FACILITY SITING DIVISION

32 South Ewing

Helena, MT 59620

June 1981

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INTRODUCTION

Northern Lights, Inc. (NLI), a rural electric cooperative based in Sandpoint, Idaho, submitted an application to the Montana Department of Natural Resources and Conservation (DNRC) in 1980 to build a hydroelectric dam and generating plant, known as the Kootenai River Project, in the Kootenai Falls area of Lincoln County, Montana. In 1978, NLI contracted DNRC to conduct a baseline wildlife investigation in the project area. The results of that study, completed in September 1979, were published later that year (DNRC 1979).

To keep the wildlife data base current and to determine the nature of year-to-year variation in wildlife use of the project area, NLI contracted with DNRC in October 1979 to continue pre-certification wildlife monitoring (see DNRC 1979 for a study plan). This study would provide a data base for documenting project-related impacts and determining the success of mitigation and compensation programs, if the Board of Natural Resources issues a certificate for the site.

This First Annual Report documents results from the first year of the Kootenai Falls wildlife monitoring study (September 2, 1979, through September 1, 1980). The area monitored in this study was the same as that inventoried during the original baseline study (DNRC 1979, pp. 2-3), although some surveys also were conducted along U.S. Highway 2 between Libby and Troy.

Field techniques and analytical methods used in this study were as described in the baseline studies report (DNRC 1979, pp. 109-112). Three biologists worked in the study area a number of times during the study period (see table 1). A brief summary of methods employed for individual study segments follows.

Species List Update

The species lists presented in the baseline report (DNRC 1979) were updated, with emphasis placed on refining habitat preference and local distribution data.

Project Area Wildlife Census

This census was designed to collect data that would allow comparison of wildlife use of the project area between months and between years. The methods used were patterned after the standard winter bird study (Kolb 1965) and breeding bird census (Hall 1964, Van Velzen 1972) techniques used in the original inventory, but were extended to include all vertebrate species. The area censused includes: the entire Kootenai River and its shorelines from 50 m (164 ft) below the proposed dam outlet to the upper end of the proposed reservoir; the land which would be inundated by the dam at a forebay elevation of 610m (2,000 ft); the land which would be affected by railroad relocation; and all remaining land between Highway 2 and the Kootenai River. The entire area was censused for three consecutive days during the months of

Table 1. Schedule of September 1979 - September 1980 field work, Kootenai Falls Wildlife Study.

Date(s)	Observer(s)	Type of Field Work
October 10-11, 1979	PN[1/]	Riparian wildlife census, bighorn sheep count, Yaak Falls census, small mammal trapping
January 15-17, 1980	PN,LT	Riparian wildlife census, bald eagle survey, bighorn sheep counts, census of Yaak Falls
April 8-11, 1980	PN	Riparian wildlife census, bighorn sheep tracking, bighorn sheep count, reptile & amphibian search, Yaak Falls census
June 2-4, 1980	PN	Riparian wildlife census, harlequin duck survey, bighorn sheep count, reptile & amphibian search, Yaak Falls census
August 11-14, 1980	PN,LT,JB	Riparian wildlife census, harlequin duck survey, bighorn sheep counts, amphibian & reptile search, small mammal trapping, census of Yaak Falls, habitat description, meadow vegetation analysis.

1/ PN-Pat Nichols
LT-Larry Thompson
JB-Jeff Birkby

October 1979, and January, April, June and August 1980, following the instructions outlined in the baseline report (DNRC 1979, Appendix F).

Bald Eagle Survey

The Kootenai River between Libby and Troy was surveyed for bald eagles on January 16 (2 counts) and January 17 (1 count), following the methods of Meyer (1979). Surveys were made from U.S. Highway 2. Bald eagles seen during general surveys and riparian habitat censuses were also recorded.

Harlequin Duck Special Studies

In addition to surveys made during riparian habitat censuses, special searches of the Kootenai Falls area for harlequin ducks were conducted each study day in June and August. In June, emphasis was placed on determining the total harlequin duck population and the number of pairs present in the project area; in August, emphasis was placed on locating broods.

Bighorn Sheep Survey

One day per visit, the cliffs north of the river between Libby and Troy were surveyed with a spotting scope from strategic viewpoints along U.S. Highway 2. All observations were recorded on field maps and data sheets.

On April 10 and 11, ground searches for evidence of sheep use were conducted on the north shore of the Kootenai River adjacent to known bighorn sheep range. These data also were recorded. Differentiating between deer and bighorn sheep sign was difficult.

Amphibian and Reptile Search

At least four hours was spent each month during April, June, and August searching likely habitat in the project area for amphibians and reptiles.

Small Mammal Trapping

Two snap-trap lines (each consisting of 25 stations with two traps per station) were run for three consecutive nights (August 11-14, 1980), one in riparian cottonwoods at the head of Kootenai Falls, and the other in adjacent riparian grassland. Capture data were recorded on standard data sheets.

Census of Yaak Falls

Water and shoreline habitats of Yaak Falls, including those areas within 100 m (328 ft) of the head of the falls (upstream and downstream), were censused for vertebrates on October 10, 1979, and January 17, April 8, June 2, and August 12, 1980, to determine the area's suitability as a future control study or compensation area.

Vegetation Analysis--Riparian Tree/Shrub Habitats

Riparian tree and shrub habitats (including the riparian cottonwood, cottonwood-conifer, and birch-alder communities described by Olsen-Elliott and Associates (1979)) on the south terrace immediately above Kootenai Falls, were sampled August 12-13, 1980, using the methods of James and Shugart (1970). This terrace would be flooded by the proposed reservoir. Ten vegetation plots, each 0.44 ha (0.1 acre) in size, were permanently staked and sampled. Locations of these plots are shown in figure 1.

Vegetation Analysis--Sheppard Meadows

Three grassy meadows on the north bank of the river about 1.5 miles above the head of Kootenai falls (DNRC 1979, p. 62) also were sampled using the canopy-coverage methods of Daubenmire (1959). These meadows are believed to be a source of early-spring forage for bighorn sheep. Because impounding the river could alter the vegetative composition and, thus, the use of these meadows by bighorns, the Montana Department of Fish, Wildlife and Parks (DFWP) has expressed concern over the project.

The property on which the meadows lie, formerly owned by Mr. Dale Sheppard, was purchased by the U.S. Army Corps of Engineers to mitigate the impacts on wildlife habitat caused by Libby Dam. The land is scheduled to be turned over to the State of Montana, and managed by DFWP for bighorn sheep.

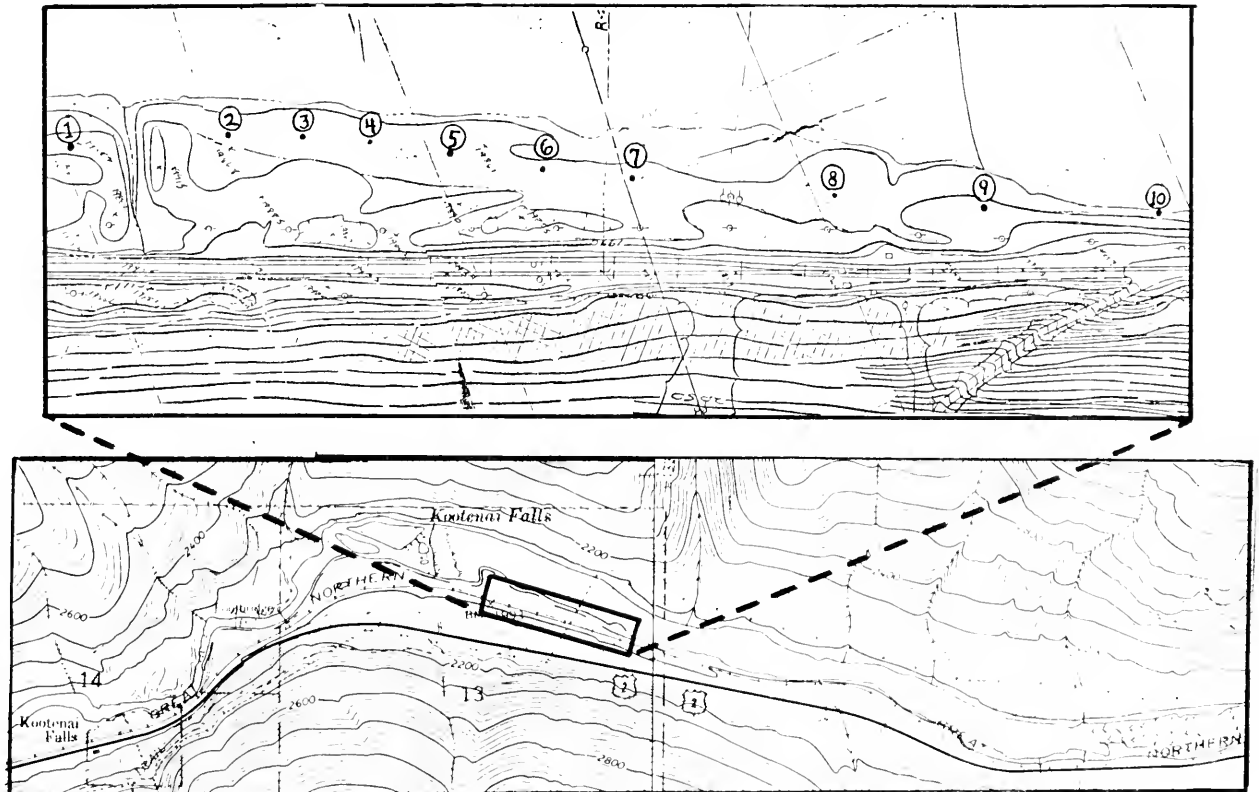


Figure 1. Locations of riparian tree and shrub sampling plots.

The following methods were used to determine the distribution of vegetation in the meadows:

1) Approximate measurements of the length and width of each meadow were made.

2) Major community types in each meadow were determined by subjectively identifying relatively homogeneous stands of associated plant species within a contiguous area.

3) Three ten-meter transects were laid out within selected major community types in each meadow. The transects were placed in what appeared to be the most representative part of each community, and were generally oriented parallel to the Kootenai River.

4) A measuring tape was stretched the length of the transect, and Daubenmire coverage frames (Daubenmire 1959) were placed on alternating sides of the tape at one-meter intervals. The percent of canopy-coverage for each plant species within each frame was noted and recorded on data sheets.

5) Color photographs of the major community types were taken. These are on file with DNRC in Helena.

6) Canopy-coverage data, originally assigned a cover class number (Daubenmire 1959), were converted to percent coverage for each plant species, using the midpoint for each class.

7) Maps of each meadow were drawn on topographic maps at a scale of 1:1,200.

RESULTS AND DISCUSSION

Species List Update

During the monitoring period, 70 species of vertebrates were observed or trapped--1 species of amphibian, 1 reptile, 55 birds, and 13 mammals. Also during the monitoring period, 13 new species (1 amphibian, 12 birds) were found, bringing the total number of species observed since the studies began in 1978 to 124 (1 amphibian, 1 reptile, 84 birds, and 28 mammals). Data on those new species are summarized in table 2. The types of data included and the abbreviations used are as described in the baseline study (DNRC 1979, pp. 23-29).

Project Area Wildlife Census

Results of the wildlife censuses conducted in the project area during the study period are summarized in table 3.

Seasonal variation in numbers of species encountered during project area censuses each month is shown in figure 2. Study data show that the number of water-related bird species (waterfowl, shorebirds, herons, gulls, ospreys, bald eagles, dippers, belted kingfishers) remains relatively constant year-round, with a slight increase during the breeding season. The number of species of other birds is relatively high throughout the year, but increases considerably during the breeding season.

Census results for the dipper are shown in figure 3, and variations in average monthly abundance of the most common waterfowl species, as determined by the censuses, is portrayed in figure 4.

Species	Habitat[1]	Where Observed[2]	Status and Abundance: This Study[3]	Status and Abundance: Skaar (1980)[4]	Months When Seen[5]: J A N	F E B	M A R	A P R	M A Y	J U N	J U L	A U G	S E P	O C T	N O V	D E C
AMPHIBIAN:																
Coeur d'Alene salamander (Plethodon vandykei)	R	L	-	-	-	-	-	-	-	-	-	A	-	-	-	-
BIRDS																
[illegible]	GB,[illegible]		fm-U	b	-	-	-	-	-	-	-	-	[illegible]	-	-	-
[illegible] Teal	GB,SW		cm-[illegible]	Bw	-	-	-	[illegible]	-	-	-	-	-	-	-	-
[illegible]	GB,SW	M,[illegible]	s-[illegible]	[illegible]	-	-	-	-	-	-	-	-	[illegible]			
[illegible]	SW,[illegible]	[illegible]	[illegible]	Bw	-	-	-	-	-	[illegible]	-	-	-	-	-	
[illegible]	W	N,[illegible]	w-P	Bw	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	-	-	-
[illegible]	SA	[illegible]	[illegible]	B	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	-		
White-throated Swift (Aeronautes saxatalis)	SA	M	[illegible]-P	L	-	-	-	-	-	-	-	\	-	-	-	-
Downy Woodpecker (Dendrocopos pubescens)	[illegible]	Cl	t-R	bW	-	-	-	-	-	-	-	-	-	-	-	-
Barn Swallow (Hirundo rustica)	SA,TR	Cl	b-R	B	-	-	-	-	-	[illegible]	-	-	-	-	-	-
Mountain Bluebird (Sialia currucoides)	R[illegible],BW	Cl,J	t-U	B	-	-	-	A	-	[illegible]	-	-	-	[illegible]		
Northern Shrike (Lanius excubitor)		[illegible]	w-P	tW	J	-	-	-	-	-	-	-	-	[illegible]	-	-
Western Meadowlark (Sturnella neglecta)	R[illegible]	[illegible]	t-R	BW	-	-	-	-	-	-	-	-	-	[illegible]	-	-

Table 2 continued.

[1] Habitat categories are listed in approximate decreasing order of preference or intensity of use. Abbreviations as in the baseline report (DNRC 1979), table 1.

[2] See baseline agent (DNRC 1979), figure 4, for location codes of river stretches (letters) and upland areas (numbers).

[3] Status: W - Overwinters in area (at least one record each during January and February).

w - Transient in winter.

sm - Spring migrant.

fm - Fall migrant.

B - Breeds on area (nest or dependent young located).

b - Probably breeds in area (territorial males or pairs located).

s - Summers on area in small numbers, but no evidence of breeding.

t - Occurs , but no evidence of breeding.

Abundance: A - Abundant, found in large numbers in appropriate habitats.

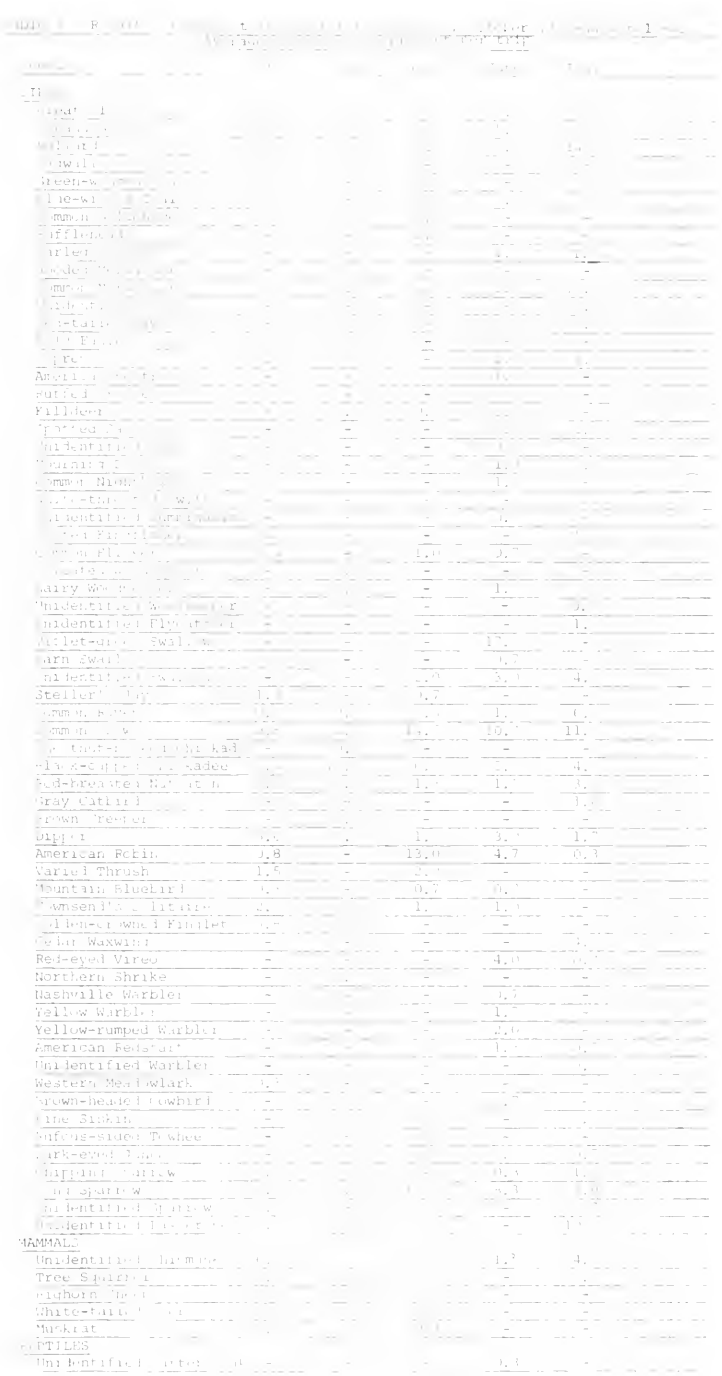
C - Common, found in moderate numbers in appropriate habitats; 15 to 50 registrations per year.

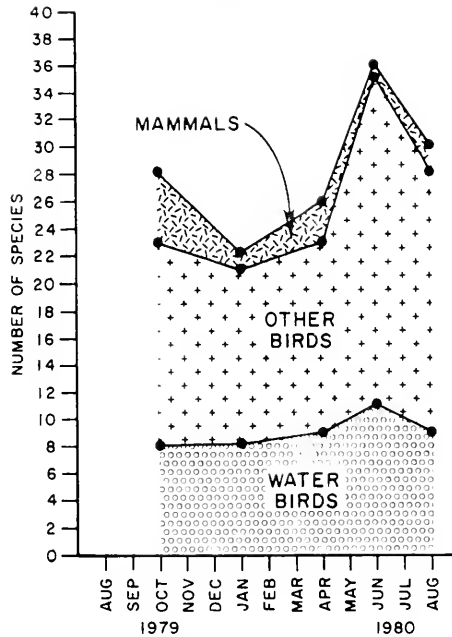
U - Uncommon, small numbers in appropriate habitats; 2 to 15 registrations per year.

R - Rare, few sightings; 1 or 2 registrations per year.

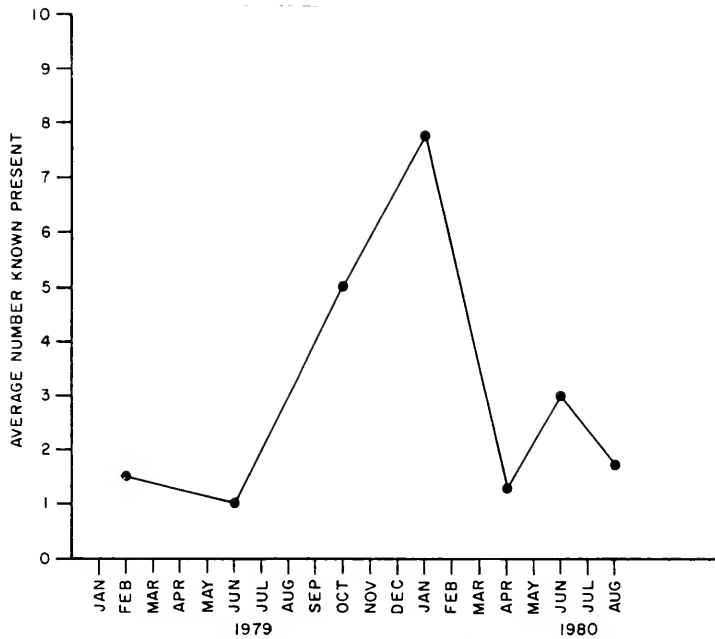
[4] Indicates status of species in latilong No. 1 as reported by Skaar (1980).

[5] Months when seen are indicated by letter abbreviations in sequence, January through December.





[illegible] Seasonal variation in average [illegible] encountered during [illegible] area wildlife censuses.



[illegible] Seasonal variation in average numbers of dippers encountered during project area wildlife censuses.

Bald Eagle Survey

During the monitoring period, bald eagles were observed only in January. No bald eagles were seen during the first two roadside counts, but two adults were viewed during the January 17 count, one near China Rapids and the other near the Libby city limits. At least two eagles, one adult and one juvenile, were known to be present in the project area (near China Rapids) during wildlife censuses. The adult was probably the one observed near China Rapids during the roadside count.

Harlequin Duck Special Studies

Information on harlequin ducks observed during the monitoring period is presented in table 4. On October 8, 1979, a female harlequin was seen in the Kootenai River approximately 3 miles upstream from Kootenai Falls, and on October 12, 1979, an adult female harlequin was shot by a hunter on the Kootenai River near the mouth of Cedar Creek, 7 miles upstream from Kootenai Falls (John Jeresek, pers. comm.). This is an unusually late record for this species in Montana. On June 2, a pair of harlequins was seen feeding and loafing among rocks in China Rapids. Despite an intensive search, no broods were located by DNRC biologists. However, in July 1980, a brood of three young was seen with one adult female and two adult males among the rocks in river section M just above the falls (Rogers 1980; Wolf pers. comm.). This is the first documentation of harlequin ducks breeding in the study area.

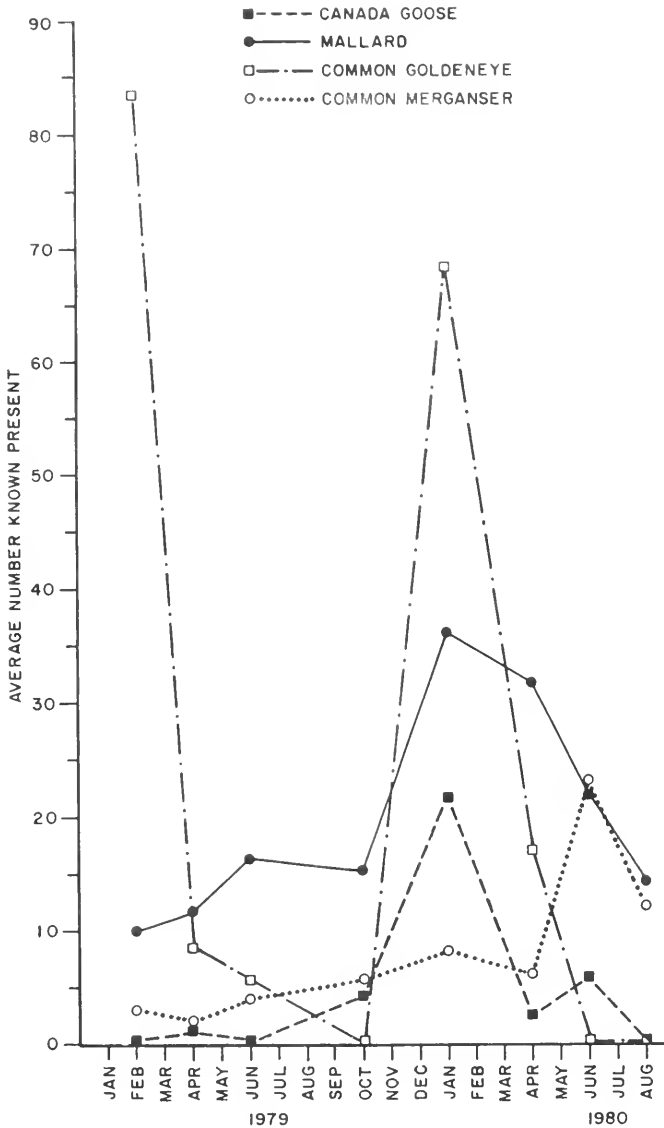


Figure 4. Seasonal variation in average numbers of Canada goose, mallard, common goldeneye, and common merganser encountered during project area wildlife censuses.

Table 4. Harlequin duck observations in the Kootenai Falls area, September 1979-October 1980.

Date	Minimum number known present				Location (River Section)[1/]
	Males	Females	Pairs	Total	
October 8, 1979	-	1	-	1	Q
June 2, 1980	1	1	1	2	P, M
June 3, 1980	1	-	-	1	M
August 11, 1980	-	3	-	3	M
August 12, 1980	-	3	-	3	M

1/Abbreviations as defined in the baseline study (DNRC 1979, pp. 14-16).

Bighorn Sheep Survey

During bighorn sheep roadside counts, 52 sightings of bighorn sheep were recorded (20 ewes, 1 ram, 19 lambs, and 3 unidentified). Locations of these and other bighorn sheep sightings are shown in figure 5.

On October 10, 1979, during the riparian survey, a group of 10 sheep was observed just upstream from the proposed dam's discharge tunnel outlet. This group consisted of 5 rams, 3 ewes, and 2 lambs. Later that day, another group of 12 sheep was observed on the open slopes above Kootenai Falls. This group contained 4 rams, 5 ewes, and 3 lambs.

On April 10, 1980, a group of three sheep was observed during the project area census. This group, bedded on the open bluff across the canyon near the proposed discharge tunnel outlet, was composed of 1 ewe and 2 lambs.

During April 1980, a ground search for evidence of sheep use was conducted on the north shore along the proposed pool. Sheep tracks and droppings were found along the jeep trail and in the apple orchard, but no sheep were seen. A bedding area, with numerous beds, was present in the orchard in the lower Sheppard Meadow. Whether this bedding area was being used by sheep or deer could not be determined.

Figure 5. Locations of bighorn sheep observations, September 1979-September 1980. (Numbers within symbols indicate group size.)

△ = October 1979
□ = January 1980
○ = April 1980
▽ = June 1980
◇ = August 1980

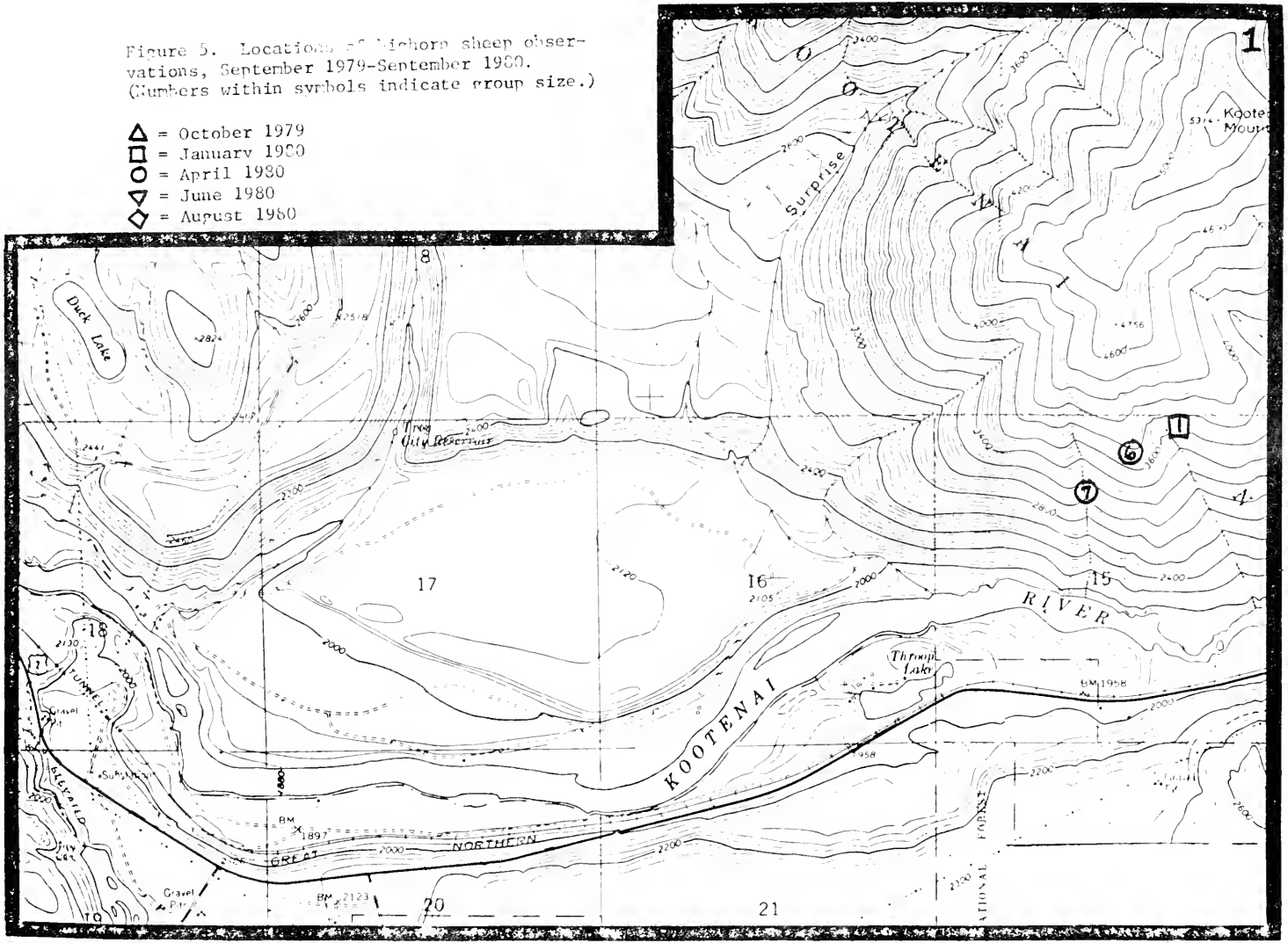
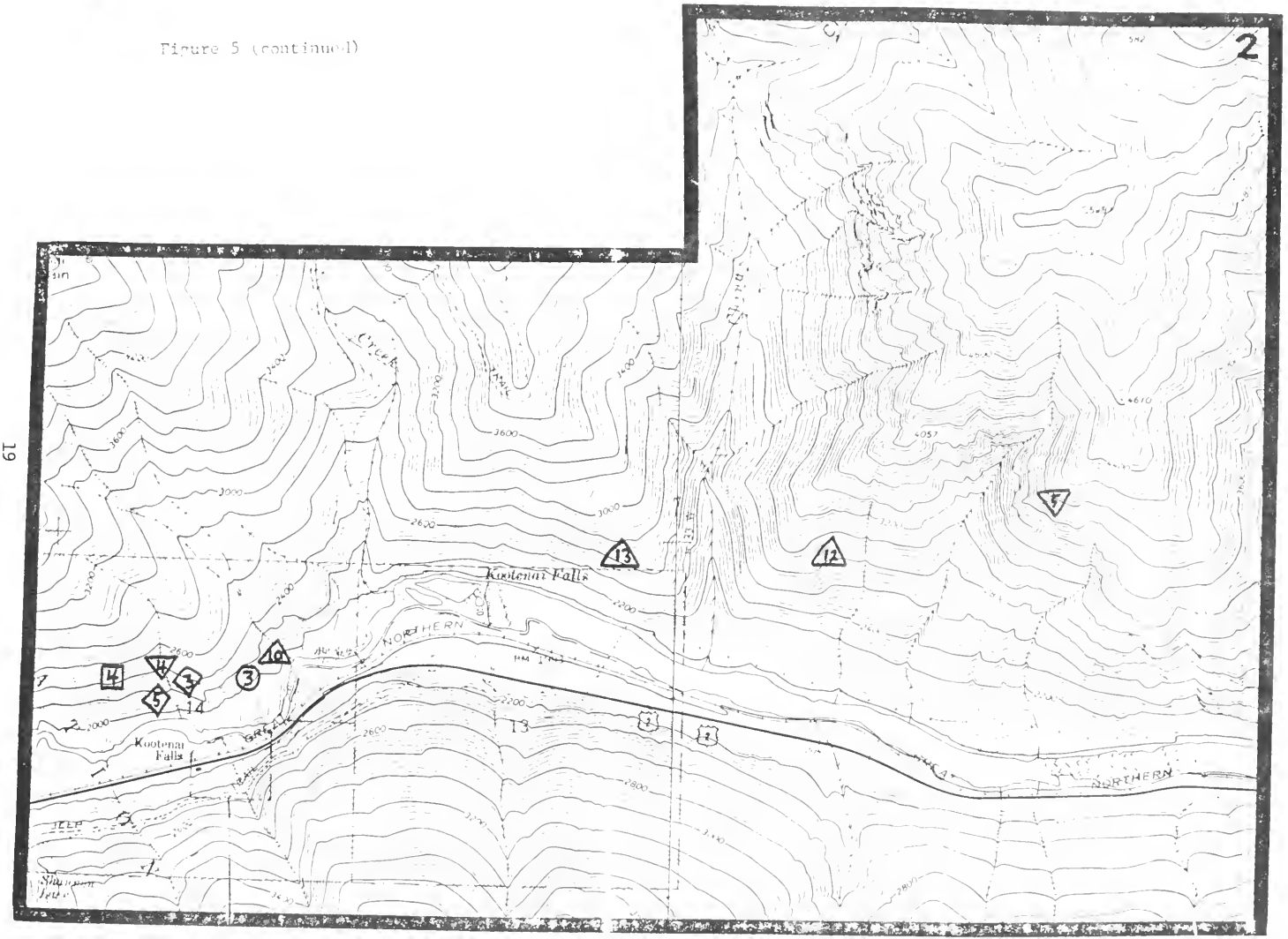


Figure 5 (continued)



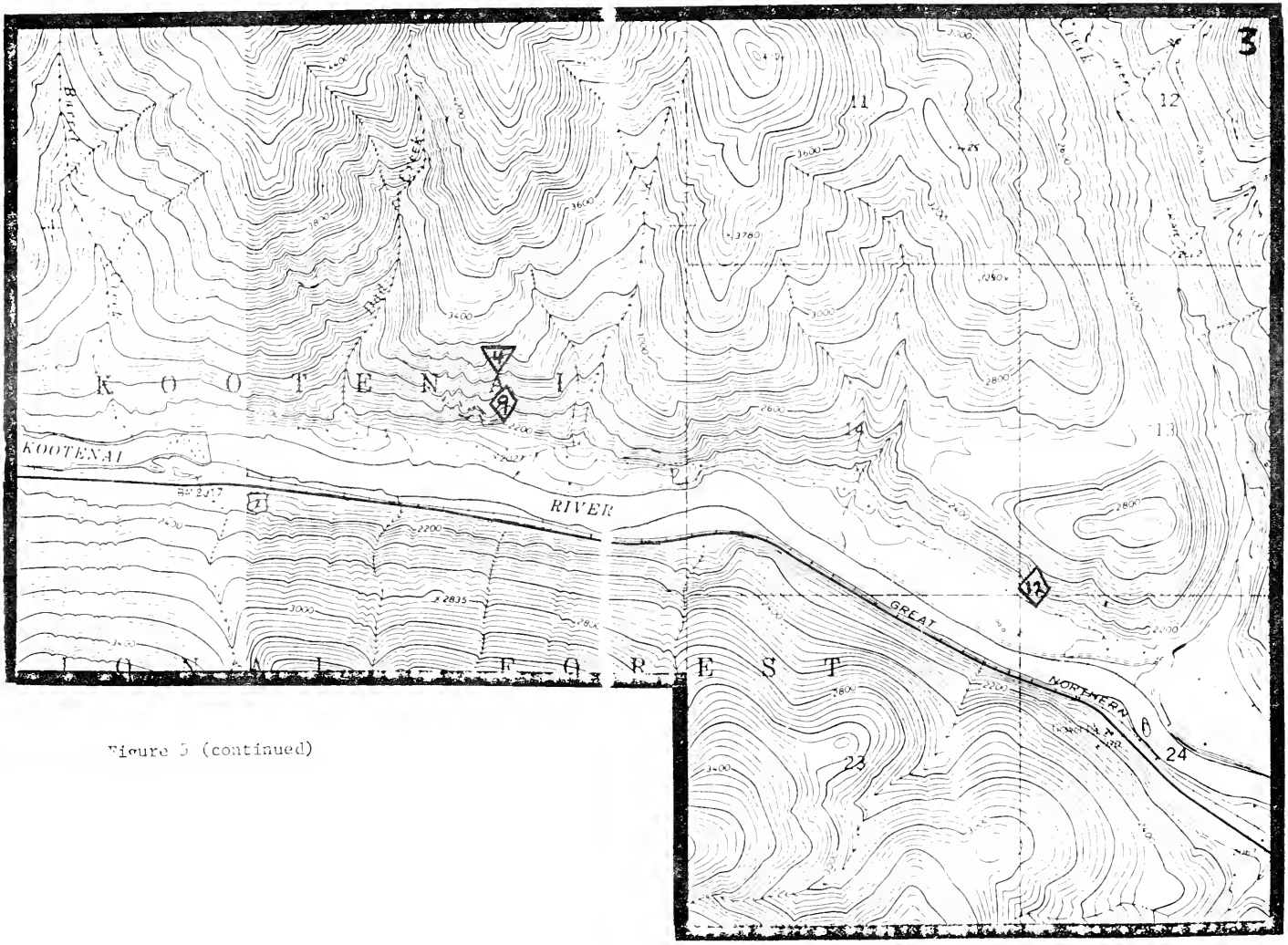


Figure 5 (continued)

Amphibian and Reptile Search

During August 1980, a population of Coeur d'Alene Salamanders (Plethodon vandykei) was discovered under moss on cliffs near the U.S. Highway 2 retaining wall. This area, proposed as the site for an access tunnel to the powerhouse, is one of the very few sites in Montana in which this species (listed as a species of special interest or concern in Montana (Flath 1981)) is known to exist. No other amphibians were observed during the monitoring period.

The only reptile found was an unidentified garter snake (Thamnophis spp.) which was seen during the June wildlife census.

Small Mammal Trapping

Table 5 presents a summary of the results of 1979 and 1980 small mammal trapping.

Census of Yaak Falls

No vertebrates were observed in the Yaak Falls area during the October 1979 and April 1980 censuses. On June 2, 1980, a single dipper and 4 black-capped chickadees were observed at the falls, and on August 12, 2 robins and a raven were observed on the shoreline near the falls. Based on these limited data, it appears that Yaak Falls does not provide a habitat comparable to that of Kootenai Falls, and would not be suitable as a control or compensation area. It is recommended that the census of Yaak Falls be dropped from the monitoring study.

Table 5. Summary of Kootenai Falls small mammal trapping program, October 1979 and August 1980.

	Floodplain Grassland			Riparian Trees and Shrubs			Total		
	1979	1980	1979&1980	1979	1980	1979&1980	1979	1980	1979&1980
Total number of captures	63	28	91	40	21	61	103	49	152
Total number of species	5	4	7	3	4	4	6	5	8
Total biomass (grams)	1265	494	1759	828	415	1243	2093	909	3002
Captures per species									
Masked Shrew (Sorex cinerus)	5	-	5	-	-	-	5	-	5
Vagrant Shrew (Sorex vagrans)	6	1	7	4	2	6	10	3	13
Red-tailed Chipmunk (Eutamias ruficaudus)	-	1	1	3	1	4	3	2	5
Deer Mouse (Peromyscus maniculatus)	26	25	51	33	17	50	59	42	101
Red-backed Vole (Clethrionomys gapperi)	-	-	-	-	1	1	-	1	1
Meadow Vole (Microtus pennsylvanicus)	24	-	24	-	-	-	24	-	24
Long-tailed Vole (Microtus longicaudus)	2	-	2	-	-	-	2	-	2
Meadow Jumping Mouse (Zapus princeps)	-	1	1	-	-	-	-	1	1

Vegetation Analysis--Riparian Tree/Shrub Habitats

Results of the 1980 riparian tree and shrub analysis are presented in table 6 and the appendix. The ten plots studied, representative of the structurally-diverse riparian tree and shrub communities which would be inundated by the proposed Kootenai Falls dam and reservoir, were found to support nine species of trees and 20 species of tall (4.5 feet or taller) shrubs or tree saplings. Overall density of trees was 436 trees per acre, and shrub density was 7,330 shrub stems per acre. Average ground cover was 62.5%, average canopy-coverage was 67.5%, and average canopy height was 46.0 feet. Color photographs taken at each plot are on file at DNRC.

Vegetation Analysis--Sheppard Meadows

Results of the vegetation studies conducted in the grassy Sheppard Meadows are summarized in figures 6-8 and table 7. Descriptions of the three meadows follow.

Downstream Meadow. This meadow (see figure 6) lies on a bench 7,100-8,300 feet upstream from the falls. Meadow elevations range from about 2,000 to 2,008 feet (msl). The meadow is about 230 m long and 40 m wide. Two barns, an apple orchard, and a fallen root cellar and homestead foundation occupy the meadow. A small spring flows into the meadow just west of the root cellar. This meadow is bounded on the north by dense coniferous forests, and on the south by the river bank, which supports a fringe of scattered trees (primarily Pseudotsuga menziesii and Pinus ponderosa).

Table 6. Number of woody stems less than 3 inches d.b.h. intercepted in two transects (74 feet long and 6 feet wide [1 arm's length wide]) through each of ten riparian vegetation study plots.

	Plot number										
Species	1	2	3	4	5	6	7	8	9	10	TOTAL
Acer glabrum	4	2	16	12	11	6	4	-	-	3	57
Alnus incana	-	-	2	-	-	-	1	1	8	7	19
Amelanchier alnifolia	5	10	18	74	35	23	44	63	-	5	277
Betula spp.	32	4	-	1	2	2	-	-	3	-	44
Cornus stolonifera	-	45	4	2	-	4	6	140	133	54	388
Crataegus douglasii	-	2	4	1	2	-	1	1	2	-	13
Eleagnus commutata	-	5	2	-	1	-	4	14	-	-	27
Juniperus scopulorum	-	1	-	-	-	-	-	7	-	-	8
Philadelphus lewisii	12	-	4	53	31	-	-	-	-	45	145
Pinus ponderosa	-	-	-	-	-	-	1	-	-	-	1
Populus trichocarpa	7	1	7	-	-	-	1	1	-	-	17
Prunus spp.	2	14	47	30	21	2	1	9	-	-	126
Pseudotsuga menziesii	-	-	-	-	-	-	-	2	-	-	2
Rosa spp.	21	9	35	11	9	105	46	12	11	18	268
Rubus ideaus	-	-	-	-	-	1	-	-	5	-	6
Salix spp.	-	-	-	-	-	-	1	7	-	2	10
Sambucus cerulea	-	-	-	-	-	-	-	-	3	-	3
Shepherdia canadensis	-	-	-	-	-	-	-	1	-	-	1
Symphoricarpos albus	-	-	5	4	-	4	-	-	38	-	51
Thuja plicata	-	-	-	-	1	-	-	1	-	1	3
TOTALS	84	73	134	188	113	147	110	259	199	159	1466

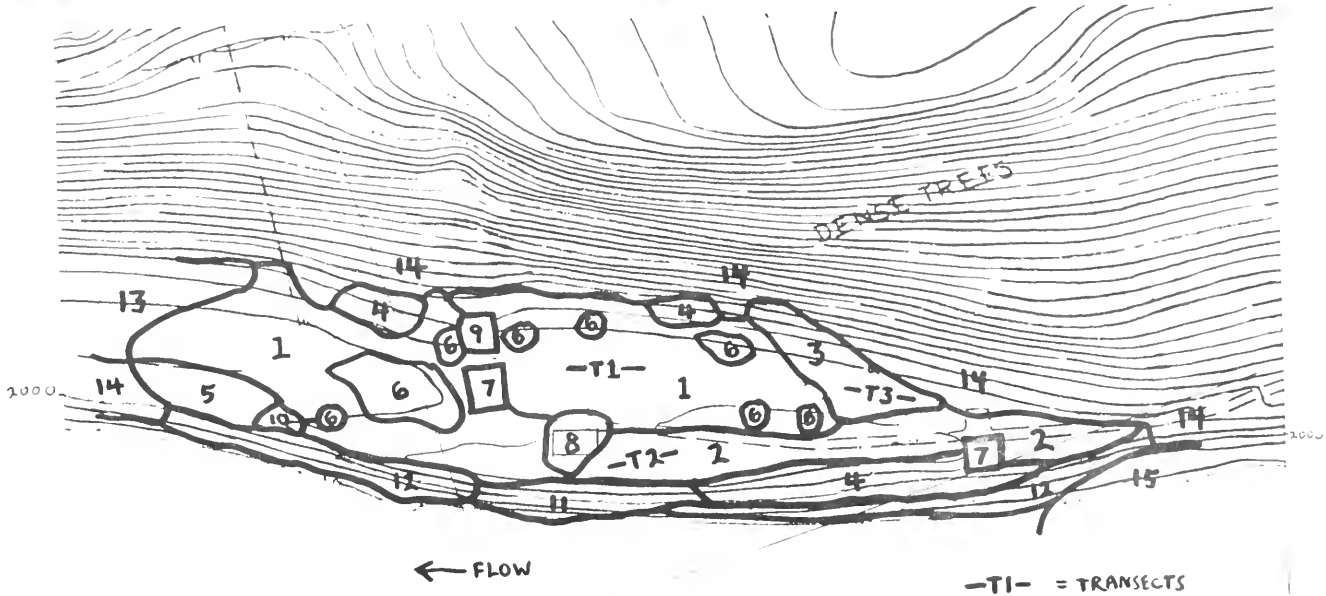


Figure 6. Dominant vegetation of the downstream Sheppard meadow. Scale = 1:1200, contour interval = 2 feet.

1. Agropyron repens, Plantago lanceolata, Poa pratensis, Medicago lupiluna
2. Agropyron repens, Achillea millefolium, Medicago lupiluna
3. Agropyron repens, Filago arvensis
4. Bromus tectorum, Poa pratensis
5. Poa pratensis, Agropyron repens, Medicago lupiluna, scattered Populus trichocarpa and Prunus virginiana seedlings
6. Apple orchard and scattered apple trees
7. Barns
8. Ornamental forbs, shrubs, lilacs and other ornamentals
9. Abandoned root cellar
10. Prunus virginiana, Shepherdia canadensis
11. Cobbles with Populus trichocarpa saplings
12. Pseudotsuga menziesii, Pinus ponderosa, Juniperus scopulorum, Populus trichocarpa
13. Betula spp., Symphoricarpos occidentalis
14. Pseudotsuga menziesii, Pinus ponderosa, Symphoricarpos occidentalis, Holodiscus discolor, Berberis repens, Physocarpus malvaceus
15. Weedy bank with many Pseudotsuga menziesii seedlings

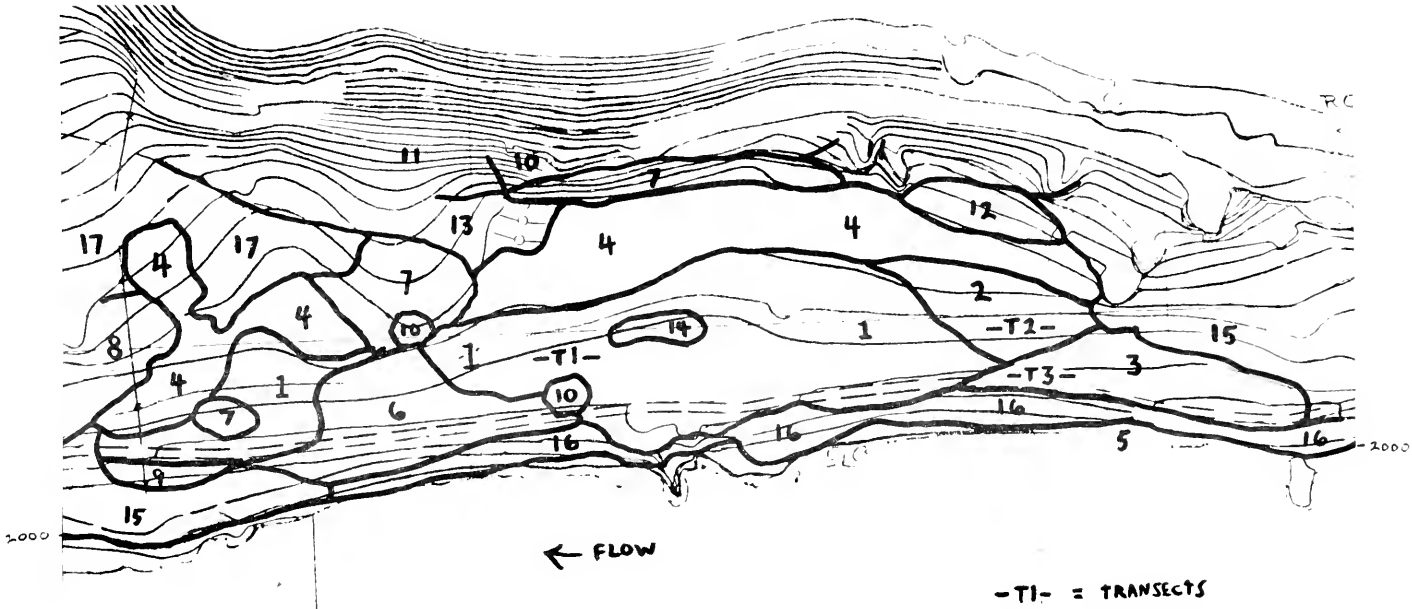


Figure 7. Dominant vegetation of the middle Sheppard meadow. Scale = 1:1200· contour interval = 2 feet

1. Agropyron repens, Poa pratensis, Plantago lanceolata
2. Plantago lanceolata, Poa pratensis
3. Filago arvense, Bromus tectorum, some young Populus trichocarpa
4. Poa pratensis, Agropyron repens, scattered Amelanchier alnifolia, Holodiscus discolor, Symphoricarpos occidentalis
5. Young Populus trichocarpa
6. Poa pratensis, Medicago lupiluna, Filago arvense, some Populus trichocarpa seedlings
7. Betula spp.
8. Betula spp., Pseudotsuga menziesii
9. Poa pratensis, Medicago lupiluna, some young Populus trichocarpa, Amelanchier alnifolia
10. Pinus ponderosa
11. Rocks
12. Young Pseudotsuga menziesii, Amelanchier alnifolia
13. Shrubby powerline right-of-way
14. Philadelphus lewisii, Amelanchier alnifolia, Prunus virginiana
15. Pseudotsuga [illegible], Pinus ponderosa, Populus trichocarpa
16. Scattered Populus trichocarpa, Pinus Ponderosa
17. Pseudotsuga menziesii, Pinus ponderosa, Berberis spp.

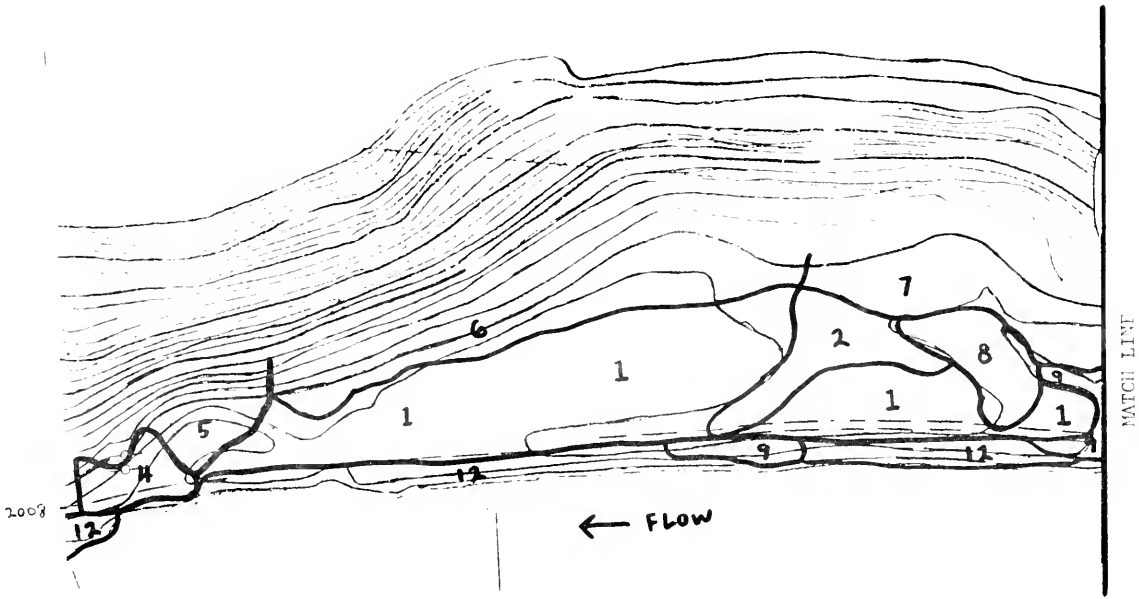


Figure 8. Dominant vegetation of the upper Sheppard meadow. Scale = 1:1200; contour interval = 2 feet

1. Poa pratensis, Phleum pratense
2. Carex spp., Mimulus guttatus,
3. Poa pratensis with young Populus trichocarpa
4. [illegible]
5. Betula spp., Crataegus spp., Acer glabrum
6. Betula spp., Alnus spp., Crataegus spp.
   [illegible]
   Pseudotsuga menziesii
8. Philadelphus lewisii
9. Populus trichocarpa, Acer glabrum, Betula spp.
10. Rock
11. Pseudotsuga menziesii, Betula spp.
12. Populus trichocarpa
13. Weedy reverbank
14. Young Populus trichocarpa

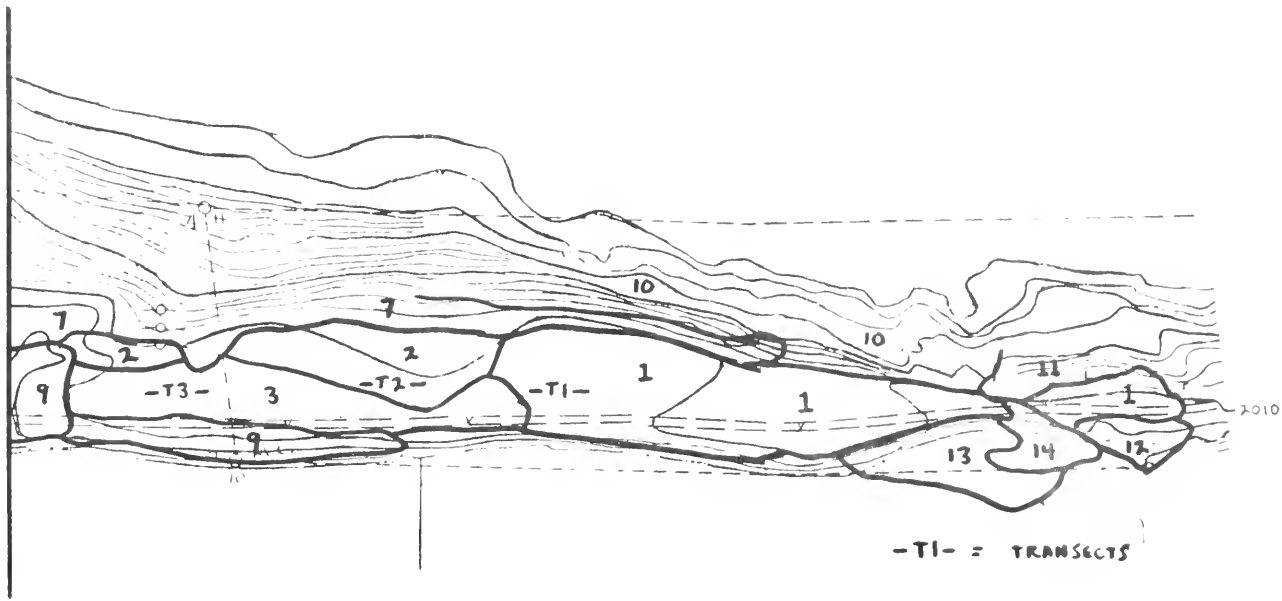


Figure (continued)

The meadow, which was once a hayfield, is dominated by a number of introduced grasses. Most of the meadow is dominated by a mixture of Agropyron repens, Poa pratensis, and Plantago lanceolata. When canopy-coverage was measured in August 1980, Agropyron repens appeared to be the dominant grass in the three transects sampled (table 7). Poa pratensis, Medicago lupiluna, and Taraxacum officinale appeared to have a greater canopy-coverage in early summer than is indicated by this August sampling; this is true in the other meadows as well.

Transect No. 1, located in a representative stand of the predominant community type, contained a large amount of Plantago lanceolata. Transect No. 2 placed on the south side of the road near the edge of the meadow, contained a large number of Achillea millefolium inflorescences and very little Plantago. Transect No. 3 was placed in a community type in which Filago arvensis was abundant.

In the southwestern corner of the meadow, seedlings of Populus trichocarpa, Prunus virginiana, and apple are becoming established among the grasses. Small patches of Bromus tectorum occur on steeper, sandy slopes at the edges of the meadow.

Middle Meadow. This meadow lies 9,500-10,200 feet upstream from the falls. It is approximately 260 m long and 50 m wide (see figure 7). Elevations range from about 2,006 to 2,014 feet (msl). A powerline crosses the meadow's northern edge, and a dirt road crosses near its southern edge. Unlike the other meadows, that portion of the meadow near the riverbank slopes gradually toward the river, rather than dipping sharply to the water's

edge. This gradual sloping may have resulted from frequent inundation and deposition of sandy alluvial soil.

The meadow is bounded on the west and east by forests of Pseudotsuga menziesii and Pinus ponderosa. The northern edge, at the base of a steep, rocky slope, is fringed by Betula and Alnus. Clumps of Betula, Alnus, and isolated Pinus ponderosa occur in the western third of the meadow. A grassy community with clumps of heavily-browsed Amelanchier alnifolia and other shrubs forms a band across the northern third of the meadow. Much of the remainder of the meadow is dominated by Agropyron repens and Poa pratensis. Transect No. 1 was placed in this latter community type (see table 7). Transect No. 2 sampled a community type dominated by Plantago lanceolata and Poa pratensis. Although not included in the transect, clumps of Agrostis alba are present in this community. Transect No. 3 was placed in a community type dominated by Filago arvensis and Bromus tectorum. Over 60% of this community type consists of bare ground, indicative of the poor water-holding capacity of the sandy soil. Young Populus trichocarpa seedlings are invading the meadow near its western and eastern edges. A fringe of scattered Populus trichocarpa and Pinus ponderosa delineates the southern edge of the meadow.

Upstream Meadow. This meadow (see figure 8) lies 11,300-12,800 feet upstream from the falls. It is about 480 m long, and has a maximum width of 30 m. Elevations range from about 2,006 to 2,012 feet (msl). A small stream lined with Populus trichocarpa, Acer glabrum, Betula, and Alnus incana divides the meadow into halves. The northern edge of the meadow, which abuts a steep rock cliff, is lined with Betula, Alnus incana, and Acer glabrum. Tanacetum vulgare, Melilotus alba, and Centaurea maculosa dominate the bank

between the river and the meadow. A fringe of Populus trichocarpa occurs along part of the bank.

Most of the meadow consists of a community type dominated by Poa pratensis; Phleum pratense is a co-dominant in some areas. Transect No. 1 sampled this community type (see table 7). Transect No. 2 was placed near the northern edge of the meadow where three seeps or springs create an area of saturated soil and standing water. The community type here, dominated by Carex rostrata, Mimulus guttata, and Equisetum pratense, contains many wetland plant species. Transect No. 3 was placed among a patch of Populus trichocarpa saplings which are invading the Poa pratensis- and Agrostis alba-dominated grassland just east of the stream.

RECOMMENDATIONS FOR FUTURE MONITORING

The monitoring study described in the baseline report (DNRC 1979) should be continued. However, results of this year's monitoring suggest the following changes in study design:

(1) October Monitoring. Fall conditions do not seem to differ enough from those of August to justify an additional week of study. Therefore, October monitoring should be discontinued.

(2) Yaak Falls. Yaak Falls does not appear suitable as a control area for the project area wildlife census or as a compensation area. Thus, the Yaak Falls census should be discontinued. However, if the dam is to be constructed, a control area for the project area censuses must be selected and added to the monitoring program no later than two years before the dam is constructed. Since an ideal control area does not seem to exist, the stretch of the Kootenai River immediately above the principal study area may be the best location for control studies.

(3) Meadow Vegetation Monitoring. The vegetation of the three grassy meadows described in this report (the "Sheppard Meadows") should be quantitatively studied the year before scheduled inundation and during alternate years thereafter, using the methods employed in this study.

(4) Bighorn Sheep Studies. To more precisely monitor seasonal use of the project area by bighorn sheep, those study methods used during the baseline study and this monitoring study should be combined. Combining these

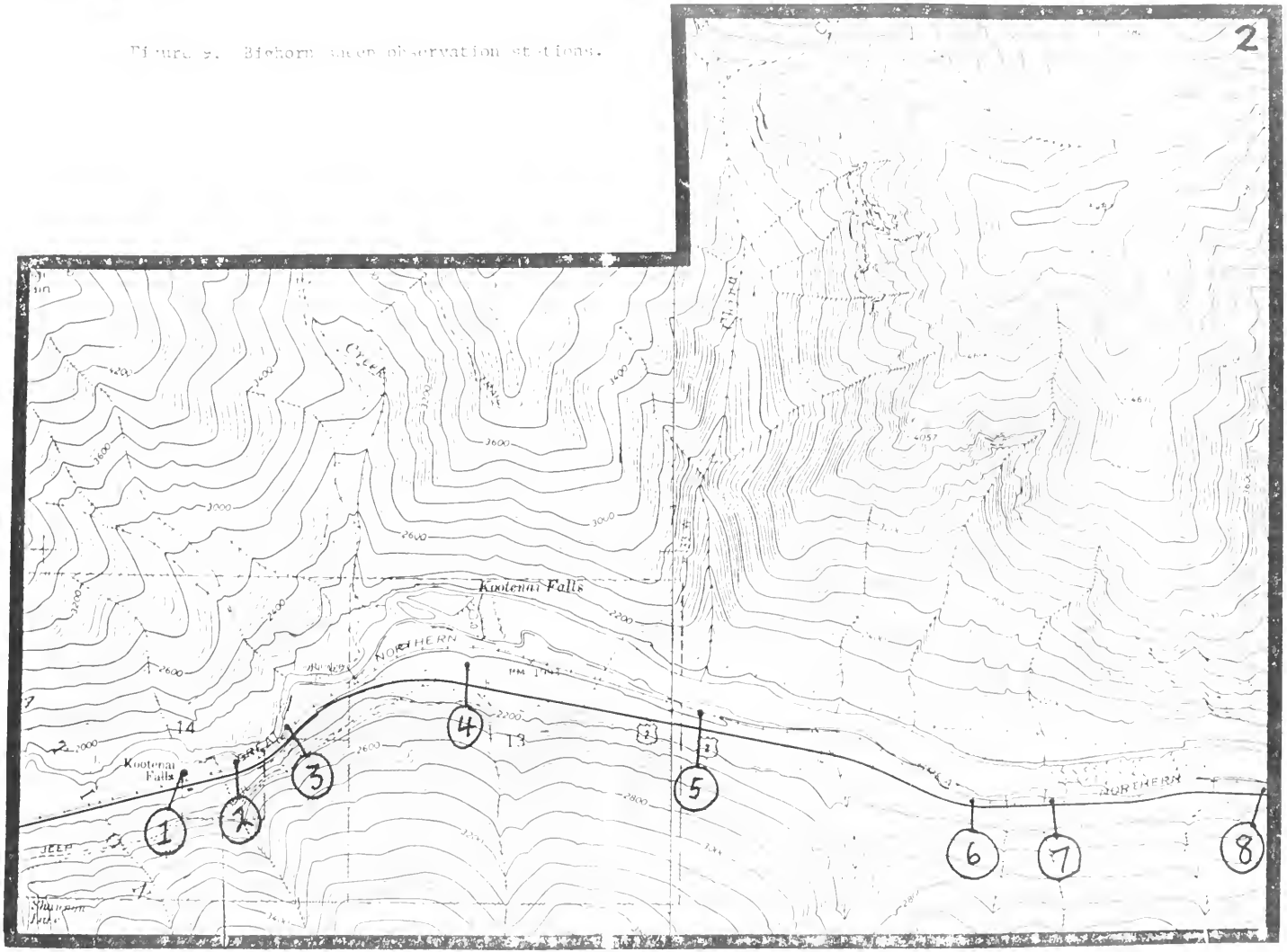
methods will provide an index through which use of project area habitats can be compared between seasons and between years.

The proposed technique for future monitoring is as follows:

The north bank of the Kootenai River--including cliffs, benches, and shoreline--will be searched with a 20X spotting scope from ten fixed observation points along U.S. Highway 2 (see figure 9). Exactly 10 minutes will be spent searching for sheep from each point; all observations from the viewpoint will be recorded on maps and standard data sheets. Sightings made while traveling between viewpoints, and duplicate observations of the same group of animals, will be noted. Weather, snow cover, and visibility conditions also will be recorded; the survey will not be conducted when visibility is impaired by fog or precipitation.

During January, June, and August field trips, researchers should attempt to visit each station three times: once in early morning, once at midday, and once late in the evening. In late March and early April, each station should be visited six times, with observation times rotated so that each station receives some morning, midday, and evening monitoring. In addition, the Sheppard Meadows will be ground-searched for tracks or other evidence of bighorn sheep use during the March-April visit.

Figure 2. Bighorn moon observation stations.



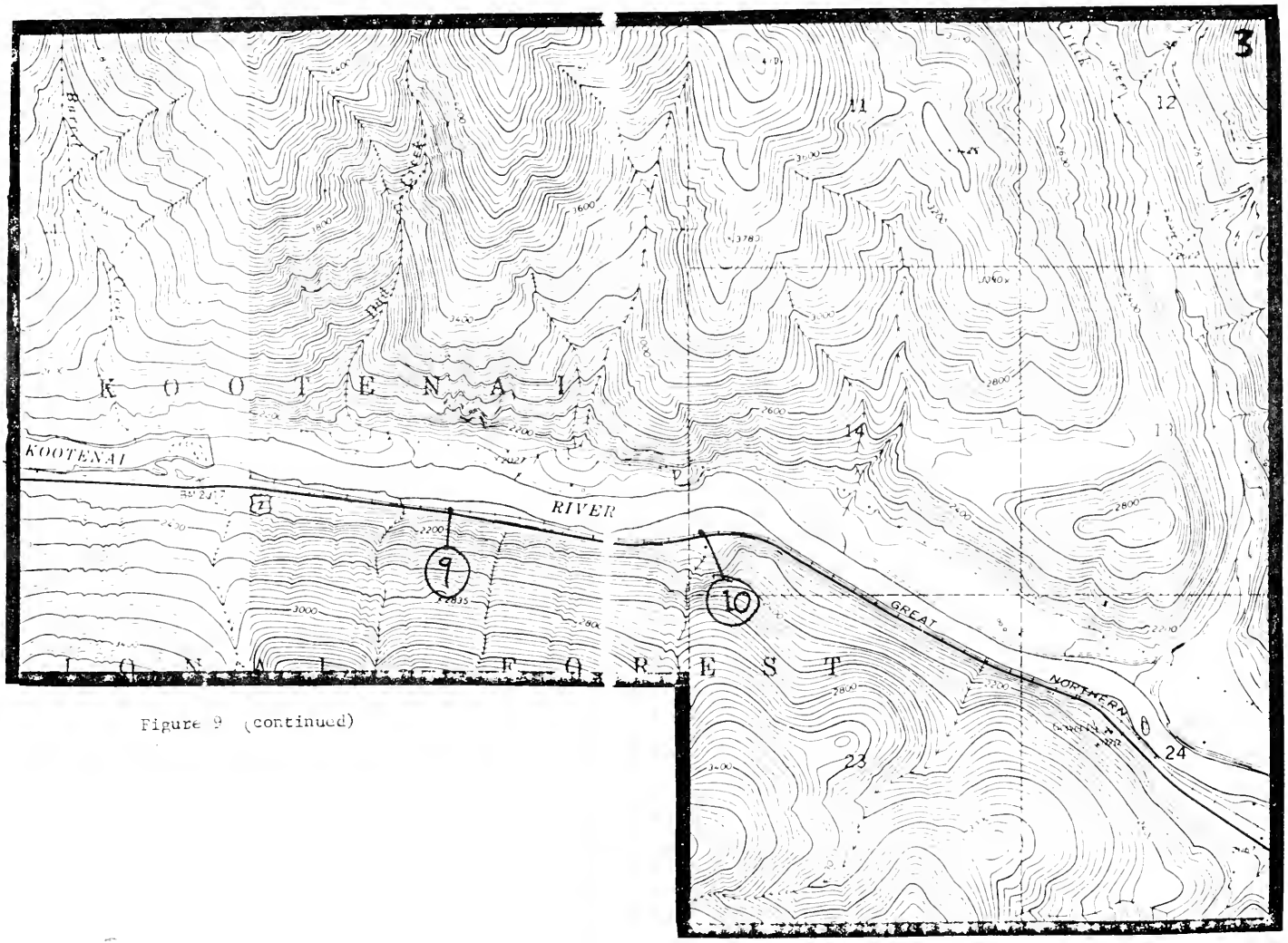


Figure 9 (continued)

ACKNOWLEDGMENTS

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Wolf, C. 1981. Letter to Larry S. Thompson, February 25, 1981.

FIELD SHEET FOR VEGETATION DATA

LOCATION LOOTENAY * ALLS | Distance & direction to nearest town having a post office

SIZE | DATE AUGUST 12-13, 1980 | LATITUDE - LONGITUDE

DESCRIPTION OF AREA

TOP GRAPH

TENTH-ACRE CIRCLES

TREES (DIAMETER SIZE CLASSES A-H 3-6, 6-9, 9-15, 15-2, 2-27, 27-33, 33-40, >40)

SPECIES*	Circle 1	Circle 2	Circle 3	Circle 4	Circle 5	Circle 6
1 Acer Glabrum				A(15), B(1)		
2 Betula spp	A(1)	A(4), B(5), C(4)		A(27), B(8)	A(32), B(20), C(4)	
3 Betula snag		A(2), C(1)				
4 Crataegus douglasii		A(4), B(1)	A(6), B(2), C(1)	A(6)	A(3)	
5 Pinus ponderosa					A(1)	
6 Populus trichocarpa	D(3)	E(1), F(1)	H(1)			
7 Prunus virginiana		A(1)	A(5)			
8 Thuja plicata	F(1)	B(2), C(1), E(1)	A(2), B(2), D(3), E(1)	E(1), F(1)	D(2), F(1)	
9 Waksmun snag			B(1)			
10						

SHRUBS (NUMBER OF WOODY STEMS LESS THAN 3 INCHES d.b.h. INTERCEPTED IN 2 ARM-LENGTH TRANSECTS)

Circle 1		Circle 2		Circle 3		Circle 4		Circle 5		Circle 6	
51	33	43	30	65	69	63	125	59	54		

GROUND COVER (20 RANDOM + OR - SIGHTINGS THROUGH OCULAR TUBE FOR PRESENCE OR ABSENCE OF GREEN VEGETATION)

Circle 1	Circle 2	Circle 3	Circle 4	Circle 5	Circle 6
18+	8+	9+	18+	16+	

CANOPY COVER (20 + OR - SIGHTINGS THROUGH OCULAR TUBE FOR PRESENCE OR ABSENCE OF GREEN VEGETATION)

Circle 1	Circle 2	Circle 3	Circle 4	Circle 5	Circle 6
1+	20+	18+	10+	15+	

CANOPY HEIGHT (MAXIMUM CANOPY HEIGHT IN FEET)

Circle 1	Circle 2	Circle 3	Circle 4	Circle 5	Circle 6
50	50	60	40	50	

TENTH-ACRE CIRCLES

TREES (DIAMETER SIZE CLASSES A-H 3-6, 6-9, 9-15, 15-21, 21-27, 27-33, 33-40, >40)

SPECIES*	Circle 7	Circle 8	Circle 9	Circle 10	Circle
1 ACER GLABRUM				A(10)	
2 ALNUS INCANA		A(1)	A(69), B(1)	A(16), B(3)	
3 ALNUS SNAG			A(2)		
4 BETULA SPP.	A(32), B(5), C(1)		A(21), B(7)	A(22), B(3)	
5 BETULA SNAG	A(7)				
6 CRATAEGUS DOUGLASII	A(1)	A(6), B(1)	A(1)		
7 PINUS PONDEROSA		E(1) B(2), D(1)			
8 POPULUS TRICHOCARPA		B(1) B(2), C(1)			
9 PRUNUS VIRGINIANA		A(1)			
10 (PSEUDOTSUGA MENZIESII)	A(1)	C(1), D(1), E(1)			
11 THUJA PLICATA			C(1)	C(1)	
12 THUJA SNAG			C(1)		
13 WAKSMUN SNAG		B(1)	A(1), B(1)	H(2)	

SHRUBS (NUMBER OF WOODY STEMS LESS THAN 3 INCHES d.b.h. INTERCEPTED IN 2 ARM-LENGTH TRANSECTS)

Circle 7		Circle 8		Circle 9		Circle 10		Circle	
72	75	76	34	171	88	139	60	80	79

GROUND COVER (20 RANDOM + OR - SIGHTINGS THROUGH OCULAR TUBE FOR PRESENCE OR ABSENCE OF GREEN VEGETATION)

Circle 7	Circle 8	Circle 9	Circle 10	Circle
15+	13+	2+	11+	5+

CANOPY COVER (20 + OR - SIGHTINGS THROUGH OCULAR TUBE FOR PRESENCE OR ABSENCE OF GREEN VEGETATION)

Circle 7	Circle 8	Circle 9	Circle 10	Circle
15+	0+	2+	13+	19+

CANOPY HEIGHT (MAXIMUM CANOPY HEIGHT IN FEET)

Circle 7	Circle 8	Circle 9	Circle 10	Circle
45	60	35	40	30

* Use abbreviated descriptions of trees, shrubs, or herbs to designate species to be identified later, eg. specific bark, peculiar crooked rest. It is important to identify only the five dominant species.

To check the adequacy of the sample: Total number of trees in 5 circles x 2 = = estimated trees/acre

Total number of trees in 6 circles x 16 =

Difference =

If the difference is less than 25 trees, the sample is adequate. If it is greater than 25 trees, see procedure

APPENDIX (continued)

SUMMARY SHEET FOR TENTH-ACRE CIRCLES

NUMBER OF CIRCLES = 10

TREES

SPECIES	DENSITY[1] — NUMBER OF TREES IN ALL CIRCLES BY DIAMETER SIZE CLASS: A 3-6	B 6-9	C 9-15	D 15-21	E 21-27	F 27-33	G 33-40	H[4] >40	TOTAL	TREES/ACRE[2] (BY SPECIES)	RELATIVE DENSITY[3] (BY SPECIES)	BASAL AREA[5] — CROSS SECTIONAL AREA OF THE TRUNK AT 4.5 FT FROM THE GROUND (d.b.h.): A[6] (0.1)	B (0.3)	C (0.8)	D (1.8)	E (3.1)	F (4.9)	G (7.1)	H (0.005 d²)	TOTAL BASAL AREA BY SPECIES, SQ FT	RELATIVE DOMINANCE[7] (BY SPECIES)	FREQUENCY[8]: CIRCLES IN WHICH SPECIES OCCURRED	RELATIVE FREQUENCY[9]
1 Acer glabrum	25	1							26	26	6.0	2.5	0.3							2.8	1.8	2	4.3
2 Alnus incana	37	4							41	41	20.9	8.7	1.2							9.9	6.2	3	6.4
3 Alnus snag	2								2	2	0.5	0.2								0.2	0.1	1	2.1
4 Betula spp.	146	66	9						221	221	50.7	14.6	19.8	7.2						41.6	26.1	7	14.9
5 Betula snag	9		1						10	10	2.3	0.9		0.8						1.7	1.1	2	4.3
6 Crataegus douglasii	27	4	1						32	32	7.3	2.7	1.2	0.8						4.7	3.0	7	14.9
7 Pinus ponderosa	1	2		1		1			5	5	1.1	0.1	0.6		1.8		4.9			7.4	4.7	3	6.4
8 Populus trichocarpa		3	1	3	1	1		1	10	10	2.3		0.9	0.8	5.4	3.1	4.9		10.1	25.2	15.8	5	10.6
9 Prunus virginiana	7								7	7	1.6	0.7								0.7	0.4	3	6.4
10 Pseudotsuga menziesii	1		1	1	1				4	4	0.9	0.1		0.8	1.8	3.1				5.8	3.6	2	4.3
11 Thuja plicata	2	4	3	5	3	3			20	20	4.8	0.2	1.2	2.4	9.0	9.3	14.7			36.8	23.1	7	14.9
12 Thuja snag			1						1	1	0.2			0.8						0.8	0.5	1	2.1
13 Unknown snag	1	4						2	7	7	1.6	0.1	1.2						20.2	21.5	13.5	4	8.5
TOTALS	308	88	17	10	5	5		3	436	436	100%	30.8	26.4	13.6	18.0	15.5	24.5		30.3	159.1	100%	47	100%
TREES/ACRE (BY SIZE CLASS)	308	88	17	10	5	5		3	BASAL AREA (BY SIZE CLASS)			30.8	26.4	13.6	18.0	15.5	24.5		30.3				
RELATIVE DENSITY (BY SIZE CLASS)	70.6	20.2	3.9	2.3	1.1	1.1		0.7	RELATIVE BASAL AREA (BY SIZE CLASS)			19.4	16.6	8.6	11.3	9.7	15.4		19.0				

SHRUBS: Total shrub stems in [illegible] transects (2 per circle) × 100, divided by the number of transects = 7330 shrub stems per acre

GROUND COVER: Total pluses (+) recorded (20 sightings per circle) × 100, divided by the total number of sightings = 62.5 % Ground Cover

CANOPY COVER: Total pluses (+) recorded (20 sightings per circle) × 100, divided by the total number of sightings = 67.5 % Canopy Cover

CANOPY HEIGHT: Average = 46.0 Range = 30 - 60

NOTES:

[1] Number per unit area

[2] Total [illegible] counted × {2 if 5 circles; 16 = 6; 4 = [illegible]; 3 = 8; [illegible] 3 [illegible]; 0 = 10}

[3] Relative density is [illegible] percent of the total number of trees which are [illegible] species in question: number of trees of the species / [illegible] number of trees [illegible] circles × 100

[4] Give estimated diam.

[5] Basal area is the cross sectional area of the trunk of a tree at 4.5 feet (d.b.h.)

[6] Multiply the number of trees in all circles in [illegible] class [illegible] the average area in square feet [illegible]

[7] Total basal area of the species / Total basal area of all species × 100

[8] Frequency indicates the evenness of distribution of the species

[9] [illegible] species [illegible] / [illegible] of all species [illegible]

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